# JOURNAL OF GAS LIGHTING & WATER SUPPLY.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. CXXVIII., No. 2686.] TUESDAY, NOVEMBER 3, 1914. [66TH YEAR.


## EDITORIAL NOTES.

### The War and Capital-Raising by Statutory Gas Companies—A Suggestion.

THE Chancellor of the Exchequer recently told the municipalities of the country that it was the desire of the Government that as much profitable work as possible should be carried out, with the humane and immediate object of counteracting distress, and that for this work—the Government not wishing the municipalities to compete with them for loans in the Money Market—they should obtain the requisite money from the loans raised by the Government, which would be on the best procurable terms. Municipalities are thus to receive the benevolent aid of the Government. In various forms, too, private enterprise has already received the timely protection of the Legislature in the abnormal circumstances which confront the financial world. Public utility companies, working under private statutes, and tied by these statutes to conditions which will seriously hamper them in the raising of capital necessary for the service of the community, will, however, be left out in the cold in the keen competition for capital which we are destined to witness in the immediate future, unless directors take some steps to protect the interests committed to their charge. Of the class of enterprise now under reference, none in the present juncture stand in greater need of some form of relief than gas companies.

It is almost needless to premise—our readers being so fully aware of the fact—that we have unbounded faith in the future of the gas industry. We are not alarmists, still less are we pessimists; but we cannot shut our eyes to the fact that to-day we are face to face with extraordinary, and indeed unparalleled, circumstances, and the future must be viewed from the standpoint of these circumstances. So viewing, it is seen that the industry will for some years have to encounter a situation of very severe financial stringency—financial stringency not only in this country, but throughout the whole of Europe. What effect will this financial situation have upon the value of gas securities, and what must, in such circumstances, be the prospect of the successful raising of capital unless there is some relief from statutory regulation? It must be remembered that national loans to, in the aggregate, enormous amounts will have to be raised throughout Europe. These loans will without doubt compete for the favour of investors here. Added to this, it is the belief of many very shrewd observers that there will be, following the conclusion of the war, a trade boom in nearly every industry; and this will also invite and absorb vast sums of investors' capital. Meantime, too, manufacturers who are desirous of taking over some of Germany's export trade, are expending, and are requiring for the purpose, additional capital. Consequently, there will, there is every certainty, be an enormous immediate and future demand for money, which may result in a big scramble, and competitive terms, being experienced.

Under these extraordinary conditions, the question for consideration is how gas companies will be affected who have to raise capital under statutory restrictions and conditions from which other offerers of capital will be entirely free. Let it not be forgotten—it is important that it should not be—that the stringency, as already remarked, is not likely to be of a few months' or a year's duration, but it is inevitable that it will continue over some years. During this period, it is hardly conceivable that there are gas companies (being participants in the enjoyment of the increased business that may be going throughout the country after the war) who will not have to raise capital. But what is likely to be their capital-raising position looking at the matter with reasonable expectancy? There will, when they need capital, be many conditions (among them the European and a general industrial demand for money) that will militate against raising capital cheaply. It is not known what will be the market prices for raw materials and the secondary products of gas manufacture; rates and taxes are sure to go up materially; there is bound to be reduced gas consumption for street, shop, industrial (in places), and, owing to economic pressure, maybe for private purposes. It is therefore more than likely that the price of gas will have to be raised in many places, as has already been done in some instances, because any possible reductions or economies in expenditure are not at all likely to be commensurate with the diminution of income. The raising of the price of gas will mean for sliding-scale companies a lowering of the dividend—due entirely to the war. The lowering of the dividend will, just when the best complexion possible will be required for capital-raising purposes, make gas stock less inviting than the capital issues of other industries untrammelled by (in the circumstances of the times) certain disadvantageous parliamentary restriction, which in other times is no doubt quite reasonable and proper for the protection of the public interests. Naturally investors will look to see where they can get the best immediate return for their money, and in this direction their money will go. In the world-wide support which will be accorded to the industries and commerce of the United Kingdom, they will see sufficient security for their money, without the parliamentary control which they have hitherto looked upon, in connection with gas supply undertakings, as a source of strength and protection, unless that control is now tempered with liberality and elasticity.

Then, again, there are the auction clauses. These were devised in order that the best possible premium might be obtained for stocks and shares, to the advantage of both gas undertakings and consumers. But, in the circumstances of exceptional financial stringency, the procedure prescribed by these clauses will be cumbrous, and will circumscribe the efforts of the companies in placing fresh capital where they are likely to get the best price for it.

In every way, it seems to us that, in the matter of capital-raising, private gas enterprise will for some considerable time, as matters now stand, be at a disadvantage in relation to other trading enterprises, quite apart from the permanent excellence of the security that is offered. Now everything that conduces to dearer capital for gas undertakings is a continuous disadvantage to consumers, and therefore an endeavour should be put forth by every board of directors to minimize any detracting causes. Any company who will have to raise capital within (say) the next five years will more than ever desire to do so under the most favourable conditions, and the most favourable conditions will not be those that show a reduced dividend in a depreciated market, or those that in any way hamper the placing of capital amid the rival claims of a great multitude of new issues and large loans.

These considerations appeal to us as, in the exceptional circumstances, quite valid ones; and we hope directors will take them seriously, together with the necessary lines of relief to secure equality in the markets with other capital raisers. We will put our views in definite form as suggestions. They are that Parliament should be asked to relieve the promoting undertaking of the necessity of raising capital under the auction clauses, and of the obligation in the case of sliding-scale companies—this we regard as a most important suggestion—to reduce the dividend payable in cases where the price of gas has been raised owing to conditions produced solely by the war, which has so seriously undermined, and will still more seriously do so, the world's economic system. The relief could extend over a number of years, or as long as the Board of Trade were satisfied

that the effects of war conditions still prevailed—with reversion then to standard conditions.

We really do not think that Parliament would ignore the argument that it would be to the best interests of the gas consumers (who form such a large proportion, and a still growing proportion, of the public) that capital should be raised on the most advantageous terms for all necessary new plant and appliances and for the extension of business. Dear capital would be an inducement to stay effort on the part of gas companies. With the case properly presented on the Bill of any company, it is inconceivable that Parliament would, in the extraordinary circumstances, insist upon slavishly adhering to their prescribed clauses in the matters referred to, but rather would they be prepared to grant the liberty to do what is right and proper to relieve the situation upon any application made to them. In passing, we suggest for the consideration of those responsible for the administration of non-statutory gas undertakings whether present circumstances do not offer an exceptionally favourable opportunity for securing the advantages of a statutory status—advantages which are very keenly appreciated by investors—on terms much more liberal than is possible in normal times. In this connection, we think the Board of Trade may be relied upon to take their cue from Parliament as to the spirit in which they should approach the consideration of any Provisional Orders submitted to them. Remember, even if the step is taken at once, it will require time to get the relieving powers, before they can be put into operation. The time will probably never be so propitious as the present.

We are aware that there is not much time for directors to take the necessary preliminary steps within the period prescribed by the Standing Orders in relation to promotions next session; but, so satisfied are we of the urgency of the matter and of its far-reaching importance in the interests of the gas industry that, if we had a controlling voice in the matter, we should not hesitate to promote legislation next session, even though we might be a little late in complying with some of the preliminary formalities that are required by Parliament.

## "Undue Preference"—The Long Eaton Council's Appeal Dismissed.

We are all apt to make mistakes. The Long Eaton District Council have made a series of mistakes. The first in which we are now concerned was when they issued a circular offering to give factory owners a preference in the matter of price for power if they also used electric current for lighting, and penalizing other consumers of current for power who employed gas for lighting. Under the terms of the circular, it mattered not that the power user employing gas for lighting might be a larger user of current for power than the other man; he would have had to pay 1d. per unit of electricity for power, against ¾d. in the case of the power user who employed electric lighting. This was nothing but a piece of cunning with a view to depriving the Gas Company of lighting business. The means proposed for doing this were the objectionable, illegal, and unfair part. The circular which set up this inequality and "undue preference" between electric power users, it is stated, was "fully considered" by the Electricity Committee of the District Council; but it has been made abundantly clear by the highest of legal authorities that the "full consideration" given to this plot by the Electricity Committee did not enable them to steer clear of an illegality. We rather think—in fact, we know—that it will be found that there are other Electricity Committees who have been unable to give a proper interpretation through their commercial acts to a very plain statutory decree. The next mistake on the part of the Council was when, upon the Long Eaton Gas Company charging them with unfair trading, and violating sections 19 and 20 of the Electric Lighting Act of 1882, they attempted to justify what was so obviously an infraction of the law. However, they believed—though the belief had no intelligent foundation—that they could justify their position. The matter, it will be remembered, was first argued before Mr. Justice Sargant; and his judgment was of such a transparent and conclusive character that the District Council would have been well advised to have let the matter rest there.

The next mistake was that the Council, still believing they could defend their "undue preference" proposal (we suspect they were urged on by other interested electricity suppliers), resolved to take further legal opinion on the position, together with the strong pronouncement made by Mr. Justice Sargant. They sought the opinion of Mr. Vesey Knox, K.C. Apparently the view of learned Counsel was that—just as the Kaiser thought it would be a small task to effect an entry into Paris—he could easily cut his way through the strong judgment of Mr. Justice Sargant, and prove to the Court of Appeal that the Long Eaton District Council were not, in their circular, proposing any contravention of sections 19 and 20 of the Act of 1882. In lengthening the chain of mistakes, the next wrong move the District Council made was to bring Mr. Vesey Knox from his customary haunts at Westminster to the Court of Appeal, hoping, by plausible argument on side-issues, to upset the judgment of the Lower Court on the main one. And this, with what result? The Court of Appeal (the Court consisting of the Master of the Rolls and Lords Justices Kennedy and Swinfen Eady) has taken the strongest possible course that it could take in condemning the District Council, and in showing the negative value of their learned Counsel's argument, by dispensing with any argument on behalf of the Long Eaton Gas Company, and unanimously dismissing the appeal. Considering the constitution of the Court, the interpolations during the argument of their Lordships, their unanimity in the decision, and the act of promptly dismissing the appeal without troubling Counsel for the respondents, the condemnation of the action of the bungling District Council was as complete as it could be. This result, and words used by the Master of the Rolls in delivering judgment, may be taken as an expression of the Court's contempt over the position taken up by the Council.

Admittedly, the decision is of immense importance to an industry which has done so much in setting-up inequality and offering "undue preference" through its marvellously, though not always ingeniously, constructed systems of tariffs, and which will now (we cannot imagine that the Long Eaton Council will be so foolish as to think an appeal to the House of Lords would be successful) have so much to undo that is preferentially wrong, unless other undertakings also desire to court litigation. Naturally, the industry does not appreciate gas companies questioning the validity of some of their commercial tactics. But who has more at stake than gas companies in this matter, and therefore the greatest right in seeing that there is not unfair and illegal trading on the part of their electrical competitors? There is only one genuine answer to this. Mr. Vesey Knox very mildly questioned the propriety of the Gas Company taking up the matter, and thought that it should be raised by an aggrieved consumer. There may not be a single consumer who would think it worth his while to shoulder the burden of fighting a local authority on the subject; while a gas company, who have to bear the aggregate loss of a transfer of custom, must take every legitimate means of defending their business, and especially (a gas company are large ratepayers) when competing with a municipal trading body, the members of which are not personally financially responsible for the results of their trading policy and acts. After the expression of the opinion of the Master of the Rolls that the "undue preference" proposition of the Long Eaton Council appeared to him to be "an attempt to crush the life out of "the Gas Company," Mr. Vesey Knox, in similar circumstances, will hardly have the temerity to again question the propriety of a gas company moving in this matter in the defence of their own interests and those of fair trading. No litigant could possibly show greater legal support for his action than the Long Eaton Gas Company can do to-day; and we heartily congratulate the Chairman and Directors, as well as the Company's Engineer and Manager (Mr. George Stevenson), upon their full judicial justification.

The Court allowed Mr. Vesey Knox considerable latitude in his argument, in dealing with matters that were not altogether germane to the one question for decision, and that was whether the circular issued by the Council offered "undue preference" as between one power consumer and another. He dealt with common business principles—some of which "common business principles" (learned Counsel only views these matters from a distance, and is not so intimate with them as those who are actively in business) are largely ignored by local authority purveyors of electricity. He spoke of competition being a factor that should always be considered in deciding whether any differences in charge should be made. In this connection, he held that the "competition was not speculative, but actual." Gas companies find that municipal electrical competition is not only actual, but highly speculative. In view of the issue in

question, the logical effect of the argument advanced is this, that an illegal method in trading is not an illegality when competition necessitates it—in other words, that it is proper and right to give a man "undue preference" if necessary on the ground of competition to get below the competitor's cost, and to cut him out. To this we cannot subscribe. Learned Counsel also had something to say about "load factor." He further contended that the Council should not only look at what the electricity cost, but also at what it was worth to the consumer. In looking at what electricity is worth to the consumer, the managements of electricity undertakings not infrequently overlook the point as to what the electricity has actually cost them. This is not trading in conformity with common business principles, about which learned Counsel had so much to say. Altogether he was most unfortunate in his submissions; his arguments would have been more appropriate in a Committee room than before a tribunal called upon to decide a point of law. At every point, either his own illustration was turned to his disadvantage by their Lordships, or else the interrogations or illustrations of their Lordships showed the error of the position he was trying to establish. At length he had to admit that one could not have differentiation of the kind sought by the Council without causing some injustice. Their Lordships, while leniently giving learned Counsel plenty of latitude, insisted that he should endeavour to show that the circular of the District Council did not offer any "undue preference." The task was a quite impossible one. It was seen and felt to be so all through; and the Master of the Rolls put, in a few words, a load of judicial contempt on the Council's attitude and case when in his judgment he said: "As to whether the circular is "right or wrong, I feel bound to say, treating the matter "seriously, it seems to me to be so plainly wrong that I do "not propose to waste many words upon it."

The decision is important to the electricity supply industry as construing for its administrators what is meant by entitled "on the same terms . . . under similar cir- "cumstances, *to a corresponding supply*," and by the words "undue preference." It is important, too, to the gas industry in helping to put an end to the perpetual trouble to which they have been exposed in connection with the extraordinary procedure—akin to the German practice of indiscriminate mine laying—of many electricity suppliers, through their tariffs and preferential treatment, to secure new custom, and the discomfiture of their competitors. The learned Counsel pointed out in the course of argument that if this appeal was lost it might be considered necessary to go to Parliament for a revision of the law in respect of this matter. If this happens, it will not be forgotten that Mr. Vesey Knox himself has supplied one of the best possible arguments, and the Long Eaton District Council one of the best illustrations, as to why Parliament should not in anywise interfere with the protection (but, if anything, should strengthen it) that sections 19 and 20 of the 1882 Act give to consumers—especially in the case of municipal traders in electricity supply. Fair trading between all parties must be defended by the Legislature. Even with these sections in the Act, there is a mass of illegality—Long Eaton is only an example—in existence in the electricity industry. To loosen the sections would extend the licence of municipal trading, and would make life intolerable for private gas enterprise when in competition with electricity ventures under municipal control.

## The Work of the "B.C.G.A."

It was quite a formal affair the third annual meeting of the British Commercial Gas Association. This was what was intended; the meeting being held purely for the purpose of regularizing matters—passing the annual report and financial statement, supplying an account of voluntary and paid stewardship, and bestowing thanks where they were due—so that business could proceed as usual. Formal though the proceedings were, there was that excellent atmosphere of resolution about the gathering that has characterized the meetings of the members from the very first, and which sustained evidence of resolution is the best possible presage for the life of the industry on its gas-trading side. The President (Bailie Thomas Paxton, of Glasgow) was in the chair. In every way, he looks the President; and his convictions and business abilities qualify him for the headship of any live commercial organization. He has robust faith in the Association. Suffice it to say, in this connection, that his training in gas administration was in the progressive Gas Department of the Glasgow Corporation. The President is completely at one with the Chairman (Mr. F. W. Goodenough) and members of the Executive Committee that, although there is war, there should be no break in the work of the Association, but that they should go "full speed ahead" in promulgating knowledge as to the uses and advantages of gas. The view was endorsed by the members present; and we are confident that the unanimity of the meeting on the point will finally dispel any contrary feeling that may have been entertained by a small minority.

It is a satisfaction that this view has been taken, as we are persuaded that, apart from the fact that the maintenance of the highest level of business during times of bad trading conditions can only be effected by activity, any breach of substantial magnitude in the labours of the Association would have imperilled both the representative expansion of the organization and the useful work that it has done, and is doing, in stimulating the members of the gas sales departments of gas undertakings, and encouraging among them initiative and adaptation in the main and detail operations of their departments. No one, as the President says, claims that the whole of the increase in the gas business of late years is alone due to the specialist efforts of the Association. A part of it is directly so attributable, and a large part indirectly. The work is of an influencing order; and, as we have so frequently declared, it is, in its numerous visible and invisible ramifications, work that could not be done so effectually and so completely, or with so much potency, by individual undertakings. The Executive Committee need all the encouragement it is possible to give them; and this encouragement would have been shown in very ill-manner by declining them full financial support just when the industry, wrestling with the strange conditions that have emerged from the war, requires the very best of their exertions. The Committee ask not only for the full support, and prompt subscription of the existing membership, but that the support should be extended by the inclusion of outstanding undertakings—numbering a thousand odd—responsible for about 21 per cent. of the gas sales of the United Kingdom. A somewhat singular thing was pointed out by Mr. Goodenough. It was that the 500 gas undertakings or so (representing about 79 per cent. of the gas sales of the United Kingdom) which support the Association are the same undertakings that contributed the major part of the expense of the National Gas Exhibition; while the remaining gas undertakings ever jog along outside all co-operative movement. Participation in co-operative propaganda for building-up gas business, we have before held, stamps undertakings with progressiveness; and what the Chairman of the Executive Committee has now divulged from the comparison made of Association membership and Exhibition contribution go to confirm what we have previously said. When asked by investors which gas undertakings merit their attention, we shall in future have no hesitation—apart from the considerations as to capital, dividend, and price of gas—in pointing out that membership of the British Commercial Gas Association is the hall-mark of directorial progressiveness, and in directorial progressiveness exists the best assurance for the maintenance of dividends. The membership has doubled since the advent of the Association; we hope to see it trebled before long. The gas industry is a national one; and it plays a considerable part in the life of the nation. That the commercial maintenance and development work of the industry should be national and co-operative is befitting to its universal position and operation.

Owing to the war, there is to be this year no annual conference of the Association other than this business meeting. But, as has been before pointed out, the arrangements for the conference are only suspended for twelve months—thanks to the generosity of the Glasgow Corporation, in which the President has been for long one of the most ardent workers in the interests of the city and its community. As Bailie J. A. Lindsay, of Edinburgh, and Mr. F. P. Tarratt, of Darlington, said at the meeting last Tuesday, the visit to Glasgow is only a pleasure deferred. It will be a very real pleasure; and more particularly if it should fortunately happen that the Glasgow City Council confers —Bailie Lindsay hinted at the possibility—upon Bailie Paxton the Lord Provostship. Nothing will give the members of the Association greater gratification than if they are privileged next October to address the President as "my "Lord Provost." They will at the same time feel a keen satisfaction in knowing that their choice of Bailie Paxton

as President preceded the choice of him by Glasgow as Lord Provost. Equally worthy of such high honour other men may be; worthier, they could not be.

## Screened Information from the Institution Council.

It is interesting to learn from time to time of the matters that engage the attention of the Council of the Institution of Gas Engineers at their meetings. But some of the notes sent out are of the most tantalizing order, owing to their ambiguous and information withholding character. For instance, through the batch of notes published to-day, members will not be greatly refreshed or enlightened by learning that "reports were presented in regard to the work of the Advisory Committee which had been appointed by a conference arranged by the Institution of Mechanical Engineers to consider how the advantages of organization and co-ordination in scientific research could be secured." Not a shred of information is granted as to the contents of these reports. Again, nothing is stated as to what is the nature of the "arrangements reported with respect to the awarding of the proposed Kelvin Medal." But of still more interest in the matter of the economy, and in no other respect, of information given is this note: "The recommendations of the Joint Committee of the Institution and the Society of British Gas Industries appointed to consider questions arising in connection with the gauging of gas-holder sheets were accepted and adopted." This is a matter of technical interest; but are the members of the Institution to wait until the annual report is circulated next May before learning the nature of the recommendations? Other equally informative notes could be picked from the budget before us; but the examples suffice. A few others are not entirely of the non-intelligence-bearing order. But just as London streets are darkened now next to "all lights out," so some of the notes on the proceedings of the Council are shortened to a degree that makes them as slender as possible in usefulness.

## Gas Profits and the Rates.

Judging from a discussion which has taken place in the Town Council, a very old problem in connection with municipal gas undertakings has cropped up in rather an acute form at Warrington. It will be seen from our news columns that the point arose on the report of the District Auditor, in which various figures relating to the past year's working of the department were drawn attention to. Among these was the large unappropriated balance, which the Auditor remarked seemed to be more than was necessary for a working balance. This item was also criticized by a member of the Council, but apparently from not altogether the same standpoint; for he remarked that the balance appeared to have been used for one object only—to draw on from time to time to subsidize the rates. Some effects of the policy, as the matter strikes him, were indicated by the Councillor; and an excellent opening (of which he took full advantage) was afforded the Chairman of the Committee to "point a moral" without "adorning a tale." His view is that which is taken far more often by chairmen of gas committees than by those of finance committees —"that the Gas Committee should no longer be a committee to bolster-up the rates of the town"—and one can only hope that he may at least succeed in getting the Council as a whole to share his opinion. If, as was averred, the question for a long time has been, "How much can we get out of the Gas Committee?" a principle has been adopted which is not the best possible in the interests of the undertaking. Indeed, that the needs of the gas-works have unavoidably to some extent been made subservient to the exigencies of the Finance Committee is a natural conclusion to be drawn from the statement that, when the profits of the department fell off, and the Finance Committee asked for a certain sum for the relief of the rates, the Gas Committee thought they could best spare it from an amount set aside for renewals to the gasholders. As a matter of fact, with a profit of some £8000, a sum of £11,500 has been handed over in relief of the rates. It would be far better, not only for the Manager, but for the undertaking, for the consumers, and also, no doubt, for the citizens generally, if the councillors would only realize the soundness of the contention of the Chairman of the Gas Committee, that "they ought to make the gas cheaply for the consumers, and let the Manager have the benefit of manufacturing and selling it cheaply." What is given to the rates must go on to the price of gas.

## Atmospheric Pollution Analyses.

There is in existence a Committee for the Investigation of Atmospheric Pollution; and they have set themselves to obtain from various districts the quantities and qualities of the deposit collected out of the atmosphere. The "Lancet" has recently published the results of the analyses with total quantities for April and May last. In view of the inquiry that has commenced by the Smoke Abatement Committee (the sittings of which have been interrupted by the war), we think it of interest to publish [see p. 235] this first batch of figures, as an example of the excellent work that is being done by the Committee referred to in the opening lines of this reference. We may not follow the matter up month by month; but at any rate we will occasionally, as the records for different seasons are published over the year, pick out specimen tables for the interest of readers. Of course, April and June are two of the months in the year when atmospheric pollution should be low in amount. The figures are instructive as showing how the pollution varies between different districts, and in the same district between different months. The "total solids" column particularly (the previous figures indicate how the "total" is made up) illustrates the variations. Take Liverpool, Newcastle-on-Tyne, and Malvern. For April last the total solids in Liverpool amounted to 15·97 metric tons per square kilometre; in Newcastle to 17·92; in Malvern to only 1·76. The great difference between the big industrial cities and Malvern can, of course, be well understood. But what happened in May, when one would expect a decrease? The rainfall figures, it will be remarked, were higher in most cases. The total solids figures for Liverpool rose to 20·84, and for Malvern to 2·69; while Newcastle registered a decrease—the total being down to 11·72. There is a curious heaviness about the figures for the Embankment Gardens in London; and we are driven to the conclusion that this must be due to local circumstances—probably to the huge hotels that flank one side of the gardens. In April the total solids deposited there equalled 15·71 metric tons per square kilometre, while in Golden Lane in the City the figure was only 7·06—less than half as much. In May, the Embankment Gardens registered 17·78; and Golden Lane doubled its April figure, with 14·59.

## Manchester and District Junior Gas Association.

Arrangements have been made for the members to visit next Saturday the Widnes Corporation Gas-Works, on the invitation of Mr. Isaac Carr, the Engineer and Manager. After tea, Mr. Robert Neill will read a paper, in the Wade Deacon Hall, on the "Woodall-Duckham Vertical Retorts at Bolton." The Hon. Secretary (Mr. James Bridge) announces that Mr. Franklin Thorp has offered to award two prizes of a guinea each for the best two papers describing or commenting on plant, apparatus, or methods of working noticed on the visits to Birkenhead, Widnes, Warrington, and Darwen. What is written should be the result of independent observation and original deduction from observed facts. One prize will be awarded to a member engaged in manufacture, and the other to a member engaged in distribution; but a distribution member may comment on a manufacture question, and *vice versâ*. The papers should be of a length of not less than 150 words and not more than 300 words. There is no limit to the number of papers which may be sent in by a member, either per visit or for all four visits, nor is there a limit to the subject-matter, provided it has been noted during the visits stated. All papers should be sent to the Hon. Secretary within fourteen days after the date of the visit. A *nom-de-plume* should be used at the end of the paper; but the writer must give his full name and address to the Hon. Secretary. All papers submitted become the property of the Association. Mr. S. Tagg, of Preston, who inaugurated this prize-giving scheme last year, with a view of encouraging the habit of thoughtful observation, will again adjudicate on the papers submitted.

**The British Patents of Karl Burkheiser.**—The British Burkheiser Company, Limited, inform us that they have for some time been the legal purchasers and owners of the British patents of Karl Burkheiser, whose name was included on p. 202 of our last issue among those of foreign patent holders. These patents have already been worked by them in this country, and, in fact, further plant is now in course of erection.

**Professor Bone on Surface Combustion.**—It will doubtless be remembered that early in the year Professor W. A. Bone, D.Sc., F.R.S., delivered, at the Royal Society af Arts, a course of Howard Lectures on "Surface Combustion," which were noticed in the "JOURNAL" at the time. They have lately been published in the Society's "Journal," and are now printed as a pamphlet, which is to be had of Messrs. W. Clowes and Sons, Limited, Duke Street, Stamford Street, S.E., at the price of 1s.

## MR. C. STAFFORD ELLERY'S RETIREMENT.

### His Work at Bath.

In the last number of the "Journal" (p. 177) we noticed the approaching retirement of Mr. C. Stafford Ellery, the Engineer and Manager of the Bath Gas Company, and gave a short sketch of his career. We are now able to supplement the particulars by the following account of his work at Bath which appeared in the "Bath Herald" last Saturday.

When Mr. Ellery went to Bath in 1880, the make of gas was 300 million cubic feet per annum; whereas last year it was 730 millions. The number of consumers was then 6700; and now it is 17,000. In 1880, the price of gas was 2s. 9d. per 1000 cubic feet, which was a low price for those days; and to-day it is 1s. 10d. Bath has for long been recognized as one of the places having the cheapest gas in the West of England. During the period of Mr. Ellery's management the capital of the Company has been increased from £187,000 to £360,000—an unopposed Bill to enlarge their capital powers having been promoted in 1901. Thus while the quantity of gas made has more than doubled, the capital is about doubled—showing that great care and economy were exercised in laying out the capital.

There has been a great advance in the methods of gas production and use since Mr. Ellery became associated with the Company. The old naked flat-flame burners have almost disappeared, and the introduction of incandescent mantles has greatly altered the gas arrangements. It should be borne in mind, in making the comparisons, that much less gas per light is used by the consumer to-day than was the case in 1880. Then gas-stoves were in their infancy. But their use has greatly developed; and the Company have now out on hire nearly 12,000 stoves. In 1894 prepayment meters were introduced; and there are now 7700 of them at work. When Mr. Ellery came to Bath the Company went fairly far afield, supplying Box; but since then they have extended their mains to Limpley Stoke, Freshford, Monkton Combe, Saltford, and Newton St. Loe. All this progress has been made in face of increasingly severe competition from electricity.

During the same period under consideration the works have been very much altered, a new gasholder has been erected, the system of carbonizing has been improved, the retort-house has been entirely altered, regenerator furnaces have been introduced, as well as stoking machinery and water-gas plant, and the manufacture of sulphate of ammonia has been taken up. Mr. Ellery has served under five Chairmen.

## DEATH OF MR. W. B. BRYAN.

We regret to record the death, last Tuesday, under painfully sudden circumstances, of Mr. William Booth Bryan, the Chief Engineer of the Metropolitan Water Board. Mr. Bryan was at the offices of the Board at Savoy Court in the morning, and appeared to be in the best of health. Towards mid-day, however, he had a heart seizure, and was removed to the Savoy Hotel, where he died just before midnight.

Mr. Bryan was born at Nottingham about sixty-five years ago, and was the son of Mr. John Bryan, a lace manufacturer. He received his education at the Grammar School, and was articled to the late Mr. M. Ogle Tarbotton, M.Inst.C.E., the Corporation Engineer. He entered the service of the Corporation at a period which witnessed a considerable expansion of municipal work; and, after acting in a less responsible capacity, he became Assistant-Engineer to the Corporation, and also to the Nottingham and Leen Valley District Sewerage Board. He left Nottingham to take the position of Borough Engineer of Burnley, which he held from 1873 to 1875; and he was afterwards Borough and Water Engineer to the Blackburn Corporation.

In 1882, Mr. Bryan came to London to take the position of Chief Engineer to the East London Water Company, and while with them he carried out some exceedingly useful works, of which only a brief indication can be given. He sank wells by means of which the Company's supply of water from the River Lea was augmented, erected numerous pumping-stations, designed and constructed the Warwick, Banbury, and Lockwood reservoirs, and increased the storage capacity of those already existing by raising the height of their embankments. He was one of the earliest advocates for additional storage in the Lea Valley; and he strove to make that of his Company as extensive as possible. How his efforts were opposed by the London County Council will be in the recollection of readers of the "Journal" who have followed the progress of the Metropolitan Water Supply.

The removal of Mr. Bryan to wider spheres of duty did not dissociate him from all professional connection with municipal work in Nottingham. Knowing probably better than anyone else the capacities of the district, he was retained for many years as Consulting Engineer to the Corporation in relation to the water undertaking. One of the latest matters in regard to which he afforded the benefit of his judgment was the erection of a new suspension bridge over the River Trent, for the purpose of carrying the water-mains from the city side of the river to the West Bridgford suburb, while affording also means for pedestrian traffic; the structure being so designed as to form an ornamental addition to the locality. The position at Nottingham he eventually relinquished, as well as other private practice.

Mr. Bryan remained with the East London Water Company until their undertaking was acquired by the Metropolitan Water Board under the Metropolis Water Act, 1902. When the staff of the new body was formed, Mr. Bryan was selected from among the Engineers of the eight Water Companies for the important position of Chief Engineer of the Board, with Mr. J. W. Restler, M.Inst.C.E., as his Deputy. Under his direction some important works were carried out; his latest achievement being the construction of the great reservoir at Chingford, capable of holding 3000 million gallons, which was opened by His Majesty the King, who was accompanied by the Queen, in March last year. In connection with this work, Mr. Bryan, it may be remembered, made a new departure by the installation of pumping machinery on an entirely new principle, the invention of Mr. H. A. Humphrey.

Mr. Bryan was a member of the Institution of Civil Engineers, having been admitted as an associate member in 1875, and transferred to the membership list in 1879. He also served upon the Council. He joined the Association of Water Engineers in 1906, and the Institution of Mechanical Engineers in 1884. It will probably be in the recollection of "Journal" readers that he had been selected to deliver the second "Thomas Hawksley Lecture" before this Institution; and had he been spared he would have done this on Friday last. He was the President of the Junior Institution of Engineers in 1907, a fellow of the Royal Meteorological Society, a member of the Franklin Institute of Philadelphia and of the New England Water-Works Association, an original member of the Institution of Municipal Engineers, and an honorary member of the Association Générale des Hygiénistes et Techniciens Municipaux de France. Mr. Bryan's contribution to the "Proceedings" of the Institution of Civil Engineers was a short note, in 1887, on "The Detection of Leaks in Water-Mains;" but in his address to the Junior Institution of Engineers he gave an interesting historical *résumé* of ancient water systems, as well as many valuable notes on modern practice.

The late Chief Engineer of the Metropolitan Water Board was Honorary Colonel of the Seventeenth Battalion County of London Regiment, and retired from the active list only as recently as June last. From 1889 to 1903 he was Lieut.-Col. commanding the Second Tower Hamlets Rifle Corps. He was an excellent shot; winning the Queen's and St. George's badges at Wimbledon and the champion badges of the Middlesex Rifle Association and the North London Rifle Club. The practical interest which he manifested in the Volunteer movement had its origin in his early association with Nottingham's old battalion, the Robin Hoods, in which he served. He had not been a particularly frequent visitor of late years to his native city, but had been the honoured guest on the occasion of some interesting Corporation Volunteer gatherings.

"Nowhere," writes a correspondent, "has the unexpectedly sudden news of the death of Colonel Bryan been received with greater regret than at Nottingham. His family's long association with the city is still maintained, as his two brothers occupy responsible official positions—one of them (Mr. J. B. Bryan) being the City Treasurer, and the other (Mr. G. Bryan) the Secretary of the Mechanics' Institution." We may add that he was a man of extreme kindliness, and ever ready to recognize and reward good service. His staff were devoted to him.

The interment took place last Saturday at Chislehurst New Cemetery; being preceded by a funeral service at Christ Church, Chislehurst. There was a large attendance of personal and professional friends and colleagues of the deceased—including Sir Corbet Woodall and Mr. W. T. Dunn.

## PERSONAL.

Mr. R. E. Taylor, the Manager of the Haslemere Gas-Works, recently had the misfortune to break his leg. He was riding through Kingston-on-Thames on a motor-cycle, when he collided with a motor-car, and was thrown off.

Mr. H. C. Handley, Chief Clerk at the Rochdale Gas-Works, who has been employed there for seventeen years, has been appointed Secretary and Manager of the Whitworth Vale (near Rochdale) Gas Company's works. The employees at the Rochdale Gas-Works have presented him with a timepiece; the presentation being made by Mr. T. Banbury Ball, the Engineer and Manager.

Mr. G. P. Mitchell, at present the Assistant Engineer and Manager at the Dundee Gas-Works, has been appointed, out of a large number of applicants, Gas Engineer and Manager to the Port-Glasgow Corporation. Mr. Mitchell was trained as a mechanical engineer at the works of Messrs. Bertrams, Limited, Sciennes, Edinburgh, and afterwards served with the Barrowfield Iron-Works, Limited, Glasgow. He received his technical training at the Heriot-Watt College, Edinburgh, and before going to Dundee was Assistant to Mr. J. W. Napier, the Engineer and Manager of the Alloa Corporation Gas and Electricity Works. He is the younger son of the late Mr. Robert Mitchell, Gas Engineer and Manager to the Edinburgh and Leith Gas Commissioners. His brother, Mr. James Mitchell, is at present Gas Engineer at Montrose. It may be added that during the past four years four

young men from the gas-works of the Dundee Corporation have obtained managerial positions in various parts of the country.

Two of the sons of Sir Corbet and Lady Woodall have responded to the call to the service of the country, and both have received commissions in the military forces, and have taken up their duties. Mr. HAROLD W. WOODALL was gazetted on Oct. 2 as Second Captain and on the Staff of the Fourth Battalion of the Dorset Regiment. He was lately a Lieutenant in the Nineteenth Middlesex V.R. Corps. Sir Corbet's youngest son, Mr. J. C. WOODALL, has been appointed Second Lieutenant in the Surrey Yeomanry, and is stationed at Bury Hill, Dorking. We congratulate both officers, and particularly Captain Woodall upon his rapid promotion. Both the new officers are married; and both have wives who wish them God-speed in the work which takes them from their homes. Sir Corbet (who is Honorary Colonel of "The Rangers") has always taken very keen interest in the Territorial movement; and it must be a great satisfaction to him to have two members of his family on active service in the hour of the country's greatest need.

## OBITUARY.

The death occurred recently at Silloth, where he had gone to recuperate after serious illness, of ex-Provost WILLIAM M'KINLEY FORREST, of Moffat, in which town he had carried on business as a bookseller and stationer for twenty-six years. He was for several years a member of the Town Council, and Chairman of the Parish Council, and at the time of his death was Chairman of the Moffat Gas Company, Limited.

The death on Sunday, the 25th ult., of Mr. GEORGE KEMP, J.P., the Treasurer of Aberdeen, has removed one of the best-known figures in the public life of the city. Deceased held several conveneerships; the most important being that of the Gas and Electricity Committee. In this capacity he took a personal pride in the progress and development of his department. During his *régime* the works at Dee Village were initiated and carried out. He gave whole-hearted support to the Avon water scheme.

## THE GAS INDUSTRY AND THE WAR.

With reference to the Order in Council dated Sept. 8 which prohibited the exportation from the United Kingdom of dyes and dyestuffs obtained from coal tar, the Board of Trade state that, on their recommendation, licences have been granted to certain firms to export some or all of the colours and dyestuffs which are specified in an issued schedule, on the express condition that the reasonable requirements of consumers in the United Kingdom in respect of such colours and dyestuffs are first supplied. Any British consumers of the colours and dyestuffs named who are unable to obtain the supplies they require, should communicate with the Board of Trade.

The only son of Mr. Donald D. Macpherson, late of Manchester, has been in the fighting-line with the Gordon Highlanders (of which he is a Second Lieutenant), but unfortunately is invalided home, having been somewhat severely wounded the week before last by a shrapnel shot. Lieut. Euan Macpherson is being tended at a Military Hospital at Wandsworth; and the latest accounts state that he is progressing favourably.

Mr. W. M. Carr, of Widnes and Ormskirk, who is at present serving with the West Lancashire Royal Engineers, at Sevenoaks, Kent, has this week been gazetted Adjutant and Captain.

Among the subscribers to Princess Mary's Fund for Providing Sailors and Soldiers with a Christmas gift are the following: Sir Corbet and Lady Woodall, £21; Messrs. Stephenson Clarke and Co., £52 10s.; Messrs. Curtis's and Harvey, Limited, £50; Sir William Arrol and Co., £25. Towards the Indian Soldiers' Fund, the Oriental Gas Company have contributed £50.

A correspondent has sent us the following account of an incident in the present war: On the evening of Sunday, the 6th of September, while General von Kluck, who had arrived at Coulommiers overnight, and had taken up his quarters in some deserted property, was conferring with his staff, there was a sudden extinction of the gas. The story is told as follows by M. Paul Birault, in "L'Opinion": "Cold and calm, Von Kluck was giving his orders. Darkness had already spread over the town; but the house in which the staff was located, and which was fully lighted, began to shake like the engine-room of a steamship. Then suddenly the light became feeble, and the gas was gradually extinguished. Von Kluck was in a terrible fright, as he did not know what danger might arise in the darkness. His escort rapidly prepared to defend themselves, and, while the officers ran to get candles, the faithful General Darmstadt hurried off to the Mairie. 'A thousand francs an hour,' he cried; 'you shall pay a thousand francs an hour.' Meanwhile he seized the Secretary of the Mairie, surrounded him by Uhlans, and led him to the gas-works. On arriving there they only found that, as the manager had left the place twenty-four hours previously, the gasholders were right down. On being informed of this, Von Kluck ordered three hostages to be taken—the Mayor, the Secretary, and the Public Prosecutor. They were locked up, and informed that they would be shot at daybreak, and the town made to pay a penalty of 100,000 frs. The three men were then left in charge of sentinels. But the staff had lost time, work had become disorganized, the charts could not be read, and a fresh plan of defence had to be improvised. Meanwhile, the English troops, following up the advantage they had gained, came nearer to the town; and at daybreak they were not more than half-a-mile from the staff's headquarters, which ran the risk of being taken. At a distance of 800 yards, one of the riflemen shot down a German sentinel; and Von Kluck decided to take flight. After hesitating as to whether or not he would have the hostages shot, he ordered them to be released. Before doing so, however, he had them fastened to a wall in front of a company of soldiers, and for twenty minutes they were kept in a state of anxious suspense—possibly out of revenge for the terror with which he had been stricken overnight. After this they were liberated. This incident in connection with the occupation of Coulommiers by Von Kluck is perhaps only a trifling event in the history of the war. But who shall say what effect momentary disorder might have had on the German staff at the decisive moment? Possibly the gas manager at Coulommiers may, without knowing it, have played a part in the defeat of the German armies."

In addition to the Third City Battalion Manchester Regiment, at Old Trafford, the Stretford Gas Company are supplying the following: Red Cross Hospitals.—Lancashire Cricket Pavilion, Old Trafford; Wibbersley, Flixton; and Basford House, Old Trafford. Belgian Refugee Hostels.—Longford Hall, Stretford; Sale Hall, Sale; and Hopefield, Urmston. Relief Office.—Urmston. All the apparatus for cooking, heating, and lighting has been provided, fixed, and maintained free of charge; but the gas will be paid for at the usual rates, as the Board are of opinion that free gas would not be conducive to economy. But in lieu thereof the Gas Company are making contributions to the funds of the various Committees. As Basford House, Old Trafford, is not in the Stretford Gas Company's gas area, the Company are only supplying them with coke at about half the yard price, delivered free to the hospital. The work and allowances will cost the Company £256 for the first twelve months, in addition to the contributions to the Prince of Wales's Relief Fund. The officers and workmen have sent in their eighth weekly contribution to the Relief Fund, making a total of £27.

The Oldham Corporation, at their meeting last Wednesday, declined to pay accounts owing to certain firms controlled and financed by Germans; and it was reported by Mr. Arthur Andrew (the General Manager of the gas and water undertakings) that one firm had already issued a writ against the Corporation. The Town Clerk expressed the opinion that accounts should be paid for completed contracts. The firms, he said, were really not alien enemies; they were registered in England. After Mr. Dixon had remarked that "every penny put into the hands of the enemy is an extra bullet to shoot our comrades," an assurance was given that no further contracts would be entered into with firms in any way controlled by Germans; and it was decided not to pay outstanding accounts until the case now pending had been settled.

In the minutes of the Salford Corporation Gas Committee it is recorded that, on the application of two doctors, the Committee have granted the loan of gas appliances for use at a refuge for Belgians, and the supply of gas, free of charge. The Committee are also supplying gas free at the Racecourse, to facilitate the drilling of the Salford Volunteer Defence Corps.

The trials of heating bakers' ovens by gas have been followed with considerable interest in Germany. The excellent results obtained with appliances of French construction—particularly those of M. Méker—have attracted the attention of the military authorities; and some months before the outbreak of war experiments were undertaken with a view to the adaptation of gas heating to military ovens. In connection therewith a special burner was tried which, it appears, gave satisfactory results; and had it not been for the strong patriotism displayed by M. Méker, who refused to construct it, it is very probable that a number of portable ovens would have been fitted up with these high-power burners. The German authorities proposed, in fact, in the event of invasion, to requisition the owners of gas-works to instal his bread-baking ovens. This would have been an unexpected new departure for Belgian and French gas-works. The correspondent who sent the foregoing particulars points out that there was to be seen at the Munich Exhibition the first realization of this idea. In Section V. there was shown a field oven, belonging to the First Bavarian Division, equipped for being heated by gas.

At the monthly meeting of the Barrow-in-Furness Town Council on Monday of last week, it was stated that all Corporation officers and servants—including those in the Gas and Water Departments—now on active naval and military service would, with the pay and allowances of the Government, suffer no loss.

The Bradford Gas Committee have decided to reduce the price of coke from 12s. 6d. to 10s. per ton. The Committee have decided also to supply gas and coke, and to lend gas-cookers, gas-fires, gas-boilers, &c., gratuitously to the Belgian Refugee Centres in the city.

# INSTITUTION OF GAS ENGINEERS.

### Proceedings at Last Week's Council Meeting.

A Meeting of the Council of the Institution of Gas Engineers was held at the Offices, No. 39, Victoria Street, Westminster, on Monday afternoon of last week—the PRESIDENT (Mr. John Bond, of Southport) in the chair.

A Committee was appointed to formulate regulations for awarding the Corbet Woodall scholarship which has been established by Sir Corbet for competition among students of the Institution—with a view to the first award being made next year.

A communication was considered from the British Engineers Association, on the question of trading with the enemy, and was referred to the Joint Committee of the Institution, the Society of British Gas Industries, and the British Commercial Gas Association.

In response to a request of the Council of the Society of British Gas Industries (at the instance of the Meter Section), a deputation was appointed to meet a deputation of the Society for the purpose of considering the effects of present methods of gas manufacture and distribution on the life of gas-meters.

Reports were presented from the District Examination Committees showing the progress which has been made in the formation of classes for gas-fitters, arranged as the result of the co-operation of the authorities of various technical schools and colleges and members of the Institution in various parts of the country.

Preliminary arrangements for the Institution's annual meeting to be held at Southport next year were discussed. It was agreed that the meeting take place from the 1st to the 4th of June.

A number of applications for membership were considered and names approved for inserting in the next ballot list. The deaths of Mr. Thomas J. Bush, of Sydney, N.S.W., Mr. Adam Cooke, of Oldbury, and Mr. Thomas Guyatt, of London, were reported, and a vote of sympathy was passed with those who had in this way been bereaved.

The recommendations of the Joint Committee of the Institution and the Society of British Gas Industries appointed to consider questions arising in connection with the gauging of gasholder sheets were accepted and adopted.

A communication was read from the University, Leeds, intimating that Mr. Harold Hollings, the holder of the Institution Fellowship there, had resigned, as he has just been awarded a scholarship by the Commissioners for the Exhibition of 1851.

The resignation of Mr. James W. Helps as member of the Advisory Committee on the Livesey Professorship of Coal Gas and Fuel Industries at Leeds University, was announced. A vote of thanks was passed, in recognition of the services he had rendered in that capacity. It was resolved that Mr. J. H. Brearley, of Longwood, be appointed to succeed Mr. Helps.

Considerations were discussed with respect to means for ensuring that the quality of coal supplied to gas undertakings should always conform to specification.

The Special Committee appointed to deal with questions which had arisen in connection with tar prices and the war crisis reported the steps which were being taken with the object of arriving at arrangements which would be acceptable to all producers and distillers throughout the kingdom.

With regard to the inquiry, *re* tar products, &c., a report was presented showing the progress which had been made in collecting and collating the information obtained from the replies received to the circular letter recently issued.

The Emergency Committee reported a communication that they had sent to the War Office urging the necessity of arrangements being made for safeguarding and regularly maintaining the inwards and outwards traffic of gas-works, and expressing the hope that an order would be issued exempting horses and motor vehicles belonging to gas undertakings from being impressed during the war. As to the latter, a reply has been received stating that not more than 50 per cent. were to be taken.

A report was presented from Mr. Alex. Wilson, the Institution's representative on the International Commission on Pipe-Threads, stating that a meeting of the Sub-Committee had been held in Paris on the 20th to the 22nd of July last, when most of the details left over by the Commission at their last meeting were discussed and settled. It was arranged that the delegates should check over the figures then arrived at, with a view to a final meeting of the Sub-Committee in Paris in November.

Arrangements were reported with respect to awarding the proposed Kelvin Medal which has been established with the balance of the fund formed for the erection of the Kelvin Memorial Window in Westminster Abbey, and in which movement the Institution of Gas Engineers has taken part.

Reports were presented in regard to the work of the Advisory Committee which had been appointed by a Conference arranged by the Institution of Mechanical Engineers to consider how the advantages of organization and co-ordination in scientific research would be secured.

It was reported that the International Congress of Mining, Metallurgy, Engineering, and Economic Geology, London, 1915, in which the Institution was to have taken part, has been postponed indefinitely owing to the war.

The report of the Finance Committee was presented and adopted; and various other matters having been considered, the meeting terminated.

# ELECTRICITY SUPPLY MEMORANDA.

**Correct Lighting in the Home.**

IN the October number of the "Illuminating Engineer," an article appears on the "Lighting of the Home." It is an article which tells illuminating engineers elementary facts concerning their business in the domestic region. It would be well if it got into the hands of other people who fit up houses with means for lighting, and who are supposed to be aware of what is required, but who by their works are known as incompetents in the art of illumination. The writer of the article seems to have had a large experience of all kinds of rooms, variously appointed. This experience leads him into superfluous detail. He tells us, speaking of the drawing-room, that "sometimes, even when the room as a whole is brightly lighted, there are little curtained alcoves that can conveniently be treated separately, forming a room within a room, where people can retire for a confidential chat." It is not stated whether these curtained alcoves should contain a strong or dim light; nor does it tell the readers that it is very bad manners indeed, in a drawing-room where other people are assembled, to retire into curtained alcoves for a confidential chat. Then another piece of profound intelligence is that in the dining-room "the table is usually the chief centre of interest." However, the main point about the article is the genuinely good advice given; and if those electrical fitters and illuminating mediocrities who do not in their present practice cause the advice to materialize would only ensure that it does so, people would be much better pleased. It is proposed in the article that the source of the light should be screened by a suitable diffusing globe or reflector. This is very necessary; but how often is it done? For the drawing-room an illumination of 3 to 5 foot-candles is proposed; and the same for the dining-room table. In the library good reading illumination should be provided; on the table not less than 3 foot-candles should be given. The importance of good lighting in the kitchen is insisted upon; for without good lighting, the assurance of cleanliness in the cooking operations is impossible. Good illumination, too, it is pointed out, is essential for the children, who ought never to be allowed to read in dimly lighted rooms, nor in rooms where their eyes are exposed to the glare of high intrinsic brilliancy filaments.

**The Voice of the User.**

Those are the salient rules laid down. They are rules that are broken every day in new electrical work, and have been broken in the bulk of the work that has been carried out. People are suffering in every town from it, and are beginning to complain bitterly. It is no good the electricians making believe that their ears have escaped a notorious fact. The writer of the "Memoranda" has been having a little change from the ordinary daily round at a place somewhat remote from the scenes of war, where things are peaceful, where little news other than in the morning papers from London comes through as to the happenings on the Continent or on sea, and where the authorities do not make any effort to hide the town at night time from Zeppelins by reducing the public and shop illumination. It was quite a decent change of environment to live in such a place for a brief period. But residence there was in what may be described as a private hotel, which two years ago was fitted throughout for electric lighting, and by the best electrical contractors in the town. All through the place the lower parts of the lamp filaments are naked, and assail the eye with caustic impertinence wherever one went or sat during the evening. And the "illumination!" The ladies knitted socks for the army because they could not read. Perhaps, in the circumstances, the electric light ought to be thanked for its support of benevolence. The men, on the other hand, said uncomplimentary things among themselves about the wretched lighting. In the centre of the lounge were three 32-candle power metallic filament lamps; and one or two single ones in the far part of the place. Where there is electric light, there is always a sort of haze about, unless the sources of light are numerous and of good power for the needs. But otherwise it is impossible to see any distance from the lights. When the local evening paper came in containing news such as might have been published in one of the "morning" editions of a London "evening" paper, there was always a straining of eyes under the centre cluster of 32-candle power lamps. Talk about the "Illuminating Engineer's" "good reading illumination," and 3 to 5 foot-candles! Nothing of the kind was provided in the establishment; and the work was done by a firm of electrical contractors. The ladies complained, too, about the meagreness of the illumination in their bedrooms, although there again two lamps of the same reputed candle value were fixed. One man stated that in his place of business he had electric light; and a West-end oculist whom he had recently consulted had advised him to have the one over his own desk replaced by an incandescent gas-burner. He had had this done, and had not since experienced nearly the same amount of eye fatigue and strain. These are matters of common conversation in such places. The "Electrical Review" and the "Electrical Times" may sarcastically refer to people who speak of the eye damage from the ultra-violet and the infra-red rays; but their sarcasm does not dispose of the matter, nor of the high intrinsic brilliancy of electric filament lamps, nor of the growing experience of the public. The worst

of the matter, however, is that there are so many electric lighting installations to-day which violate all the rules laid down in the article before us, but which it would cost much money to put right.

**Light for the Workman and his Family.**

But what always strikes us as a most peculiar thing is that, though foot-candle and screening prescriptions are made by illuminating engineers for the lighting of good class houses, electrical engineers abuse them right and left when proposing to enter upon the business of lighting workmen's cottages or flats on the fixed price per week system. Is the eyesight of the workman, his wife, and children less important to him and them than the eyesight of the well-to-do man, his wife, and his children? Apparently the electrical engineer impertinently thinks it is not. We never see in these cottage and other fixed-price schemes that any means are proposed for screening the lights by a suitable diffusing globe or reflector. The naked small-power lamp is put up, and left to the dual business of rendering such illumination as it is capable of, and of gradually but surely damaging the vision of those who use it. The article protests against children reading or working in dimly lighted corners of a room. Picture the workman's living-room (which is probably the kitchen) with a single 16 or 24 candle electric-lamp in it with the filament exposed. Is this the light by which the workman should read his paper, the wife work with her needle, and the children do their home lessons? They require (if an electric filament lamp is employed) a screened light and 3 to 5 foot-candles on their work, or at the reading plane, just as much as the man and family living in a better class house. One cannot differentiate between the illumination for the same purposes in different class houses, when the prescription is founded on correct principles. The reason for this violation of scientific illuminating rules by electrical people is that eyesight and sufficiency and quality of illumination must all be sacrificed to gain the necessary economy to attract custom.

**Compulsion at Finchley.**

If workmen want to occupy certain dwellings owned by the Finchley Borough Council, they must use electric light, and pay for it a sum which is artfully hidden away in the rent. This is to be an experiment for six months; and, in order to bring the scheme into operation, the persons who are the present tenants are to be given (if they have not already been given) notice to quit, in the event of their not being prepared to pay the extra. This despotic action is all for the purpose of letting the Electricity Department have an opportunity to experiment in the lighting of workmen's cottages. Just fancy a working man being compelled to move from his house simply because he does not choose to pay 8d., 9d., 10d., or 1s. extra a week for electric lighting. The suggested weekly charges are to be as follows: Houses rented at 5s. 9d. per week, 8d.; those rented at 7s. 6d. per week, 9d. Houses with a rental value of 8s. 6d. per week will be charged 10d.; while 1s. will be the weekly charge for property rented at 10s. 6d. per week. No information is at hand as to the candle power or number of the lamps that it is proposed to supply to these houses, so that it is impossible to ascertain what value the Germanic compulsion method proposes to give these poor people for the additional sum to be added to their rents. As a check on waste, but not upon the individual, a meter is to be connected up with every block of dwellings. The writer of "Installation Topics" in the "Electrical Times" sees danger in this. He says: "It will be necessary to keep a close watch upon the consumption in the absence of individual meters. While British workmen are, as a rule, anxious to play the game, there are always a certain number who will not hesitate to keep lamps burning needlessly." That is a very old truth revived.

**The Electric "Fire" and the Heating Season.**

We see the Electricity Publicity Committee have come out of their hiding-place, and have had posters with three prettily coloured pictures on them, placed on the walls of certain London railway stations. The heading is "Hygienic Heating." The expenditure of money in this direction benefits the printers; if it captures a few householders for electric heating, it only means additional electric "heaters" for the gas authorities to take out later on, after the householders have sat in bitterly cold weather in a room in company with an electric radiator, consuming 1 or 1½ units of current per hour, ineffectually attempting to conquer the low-temperature atmosphere. Of course, gas men and electricians look at the respective methods of heating from different points of view; the public looks to the largest value it can get in the way of heat under the worst possible atmospherical conditions, and by labour-saving means. The verdict of the public is found in the rate at which in recent years it has demanded the productions of gas-fire makers, and the rate at which it has compelled gas undertakings to equip their establishments with gas-fires. It has been a question of getting a sufficiency of fitters to meet the rush of work, which somewhat frequently includes the displacement of electric radiators.

**Silly Statements from the "Electrician."**

It must be the unit of the editorial staff of the "Electrician" responsible for the buffoonery department who wrote an editorial recently on the "Electric 'Fire' Season" for the "Commercial Section" of the paper. How central station engineers wish that all were true that he says on the subject. Take the following as an example:

> That section of the general public which has had experience of electric "fires" is loud in its praise of their convenience, portability, and efficiency. They are *keenly sought after* in districts where the charges for electrical energy are sufficiently low to admit of their regular use. . . . Householders and commercial men who have had some experience of gas-stoves are *eagerly turning* to the electric-"fire," because it posseses the distinctive feature of portability. It operates without a flue, and this is a great advantage; moreover, there is an entire absence of smell and risk of explosion. The campaign of the British Commercial Gas Association in advertising and pushing gas-fires has proved of immense value in paving the way for the introduction of the electric-fire. From the station engineer's and the electrical contractor's point of view, it simplifies matters considerably. As a general rule, the user of a gas-fire is not a satisfied consumer.

Does this type of folly please the electrical readers of the "Electrician?" They know as well as gas salesmen do who have had a hand in many electric radiator displacements that "loud in its praise," "keenly sought after," and "eagerly turning," are expressions that in actual experience, though perhaps pardonable in fiction, require a large amount of moderating to make them approximate the truth in this connection. A system of heating which requires a flue, scientific observers tell us, is most sanitary. The British Commercial Gas Association will be interested in learning that they are doing such useful work for the electricity industry. As the work is of advantage to the latter, perhaps the electricity undertakings will feel it rather undignified to obtain benefits from the publicity organization of the gas industry without paying for them, and so will like to subscribe to a continuation of the good work. Any monetary subscription that they choose to send will be promptly acknowledged. Perhaps the contributor of the curiously disordered article in the "Electrician" will try, in his graver intervals, to reconcile the statement "as a general rule the user of a gas-fire is not a satisfied consumer," with the large extension of the use of the gas fire the past four or five years—an extension the rate of which has not abated since it set in. We should like to know the result of his effort at reconciling with solid fact the statement he makes.

## WORKS TOPICS.

**By "Modus Operandi."**

### Standard for Heating Value.

As reported in the "Journal" for Oct. 20 (p. 142), the State Public Utilities Commission of Illinois has adopted a set of rules for establishing standards for gas and electricity service in the State. It is noticed that in several respects these rules are laid down on principles which are likely to appeal to the gas engineer as being both adequate to the consumer and equitable to the supplier. Seeing that the same statement made in the case of the regulations in force in this country would be open to question, it is proposed to discuss briefly the main points contained in these rules, so far as they concern the manufacturing side.

Firstly, there is no illuminating power standard; in fact this is not even mentioned. So far as quality is concerned, heating value purity, and pressure alone are considered. It is stipulated that the heating value shall be determined on at least three days each week, and that the gas, when tested at any point at least one mile from the works, shall have a monthly average total heating value of not less than 565 B.Th.U. per cubic foot; and that at no time shall this figure be less than 530 B.Th.U. per cubic foot. To arrive at the monthly average the results of all tests made on the days prescribed for testing during the calendar month are averaged; and the average of all such daily averages is taken as the monthly average.

While disagreeing with the standards fixed, so far as English conditions are concerned, the principle of basing a standard upon a monthly average, together with a fixed minimum for daily tests, would appear to meet the case from the point of view both of supplier and consumer. This principle is doubtless better than that adopted in this country, where a definite figure is named as the standard over and under which the gas will vary to a considerable extent from day to day. The principle of the fixed minimum or penalty standard is the same in both cases.

In the case of the Gas Light and Coke Company's standard (540 B.Th.U. gross, with a penalty standard of 499½ B.Th.U.), there is no doubt that gas will be supplied on some days above 540 B.Th.U., and on other days below it. Further, if they wished, and were able to do so, this Company would have it within their power to supply gas of 500 B.Th.U. on every day throughout the year without incurring penalty. Such action would naturally be utterly opposed to the spirit of the arrangement, but that this course could be taken at all indicates that there is something wrong with the principle.

The adoption of monthly averages, with a fixed minimum for daily tests, would, however, overcome this fault. The consumer, knowing that the Company were compelled to supply gas of an average quality of 540 B.Th.U. gross, would value it at its proper worth, and would know what he was buying; whereas in our case he is much more likely to value it at the penalty standard of 499½ B.Th.U. Most consumers, like other human beings, would quite naturally assume that the Company would not go to the

expense of supplying a gas of higher quality than they are legally obliged to do. Thus arises misconception, with the result that the quality of the gas does not receive full recognition. There is altogether a looseness in the fixing of the standard in this country which gives no tangible idea whatever as to the actual quality of gas supplied.

### Standard for Sulphuretted Hydrogen.

In the matter of a standard for sulphuretted hydrogen the Illinois rule that the gas shall not contain more than one grain of $SH_2$ per 100 cubic feet is thoroughly sound and quite adequate. It is altogether more sensible than the fixing of a standard which enforces the supply of a gas containing less than some indefinite and infinitesimal fraction of a grain per 100 cubic feet. In our case the fear that the examiner will obtain a slight discoloration, caused by gas containing, perhaps, no more than $\frac{1}{10000}$ part of a grain per 100 cubic feet, should be quite unwarranted. In actual practice what does this mean? It means that purifiers are discharged, with all the attendant expense, more frequently than would be the case if a one-grain standard were fixed. This is greatly accentuated where the purifying capacity is on the small side. Again, the carrying out of so stringent a test results in unnecessary expenditure on more purifying plant than would otherwise be required. Considering, too, that the combustion of sulphur compounds and sulphuretted hydrogen gives the same product, the limitation of the restriction to one grain per 100 cubic feet would be absolutely justified.

### Rules for Pressure.

It is, further, interesting to notice that it is stipulated that the pressure of gas supplied, as measured at the outlet of any consumer's meter, shall not be less than 2 inches nor more than 8 inches of water pressure. It is also provided that the daily variation of pressure at the outlet of any one meter shall never be greater than 100 per cent. of the minimum. To carry out these rules portable recording pressure-gauges are to be employed frequently to test pressures throughout the system. It need only be remarked that these rules, relating to pressure, will undoubtedly ensure satisfaction to consumers, who so often complain of insufficient, but rarely of excessive, pressure.

## ATMOSPHERIC POLLUTION.

The "Lancet" for the 24th ult. contained the first of a series of results obtained by the Committee for the Investigation of Atmospheric Pollution at various stations in the country, in regard to the quantity and quality of the deposit collected out of the atmosphere by the standard gauges set up at these places. The tables below give the rainfall for the months ending April 30 and May 31, 1914, and the amounts found of insoluble matter (tar, soot, dust) and soluble matter (sulphates, ammonia, and chlorine) in the volume collected. It will be seen that the laboratory findings are calculated into metric tons of deposit per square kilometre during the month. One metric ton per square kilometre is equivalent to approximately 9 lbs. per acre, or 2·56 English tons per square mile.

These comparative figures are well worth studying, inasmuch as they show considerable variations in the degree of atmospheric pollution at different stations. To take one example, Malvern shows for the month of April a total deposit of solid matters of 1·76. These contained no tar at all, and but little carbonaceous matter. In the same period, however, at Liverpool the total solids amounted to 15·97 metric tons, and the tar to 0·36 ton. All through there are most interesting and significant comparisons to be made, and when the series for the year is completed a very valuable and instructive record will be available. Our contemporary considers that the Committee may be congratulated on the practical movement they have successfully organized to obtain actual records of atmospheric pollution taking place throughout the country.

*Summary of Reports for the Month ending April 30, 1914.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Place. | Rainfall in Millimetres. | Metric Tons of Deposit per Square Kilometre during Month. | | | | | | | | |
| | | Insoluble Matter. | | | Soluble Matter. | | Total Solids. | Included in Soluble Matter. | | |
| | | Tar. | Carbonaceous other than Tar. | Ash. | Loss on Ignition. | Ash. | | Sulphate as ($SO_4$). | Chlorine (Cl). | Ammonia ($NH_3$). |
| England— | | | | | | | | | | |
| Exeter | 32·30 | 0·04 | 2·05 | 4·71 | 0·97 | 1·61 | 9·38 | 0·74 | 0·29 | 0·02 |
| Kingston-on-Hull | 10·25 | 0·08 | 2·71 | 4·76 | 0·94 | 2·50 | 10·99 | 1·34 | 0·31 | 0·03 |
| Liverpool | 22·23 | 0·36 | 2·18 | 8·01 | 2 40 | 3 02 | 15·97 | 1·93 | 0·61 | 0·13 |
| London— | | | | | | | | | | |
| Embankment Gardens | 15·61 | 0·27 | 5·38 | 6·31 | 0·72 | 3·03 | 15 71 | 1·40 | 0·39 | 0·04 |
| Golden Lane | 19·27 | 0·03 | 1·41 | 2·24 | 1·15 | 2·24 | 7 06 | 1·38 | 0·42 | 0·07 |
| Meteorological Office | 18·70 | 0·05 | 2·43 | 5·63 | 1·87 | 2·61 | 12·59 | 1·46 | 0·98 | 1·11 |
| Malvern | 32·19 | 0·00 | 0·14 | 0·21 | 0 39 | 1·03 | 1·76 | 0·34 | 0·14 | 0·17 |
| Newcastle-on-Tyne | 15·31 | 0·17 | 4·05 | 10·55 | 0·98 | 2·17 | 17·92 | 1·27 | 0·24 | 0·04 |
| York | 13·23 | 0·11 | 2·17 | 3·26 | 0·96 | 1·69 | 8·19 | 0·78 | 0·34 | 0·52 |
| Scotland— | | | | | | | | | | |
| Greenock | 94·70 | 0·03 | 1·32 | 3·13 | 1·71 | 3·45 | 9·64 | 1·37 | 0·81 | 0·07 |
| Leith | 24·63 | 0·08 | 1·01 | 3·27 | 1·53 | 1·02 | 6·91 | 0·79 | 0·21 | 0·05 |
| Paisley | 75·80 | 0 08 | 4·17 | 6·46 | 2·42 | 2·73 | 15·87 | 1·67 | 0·76 | 0·09 |

*Summary of Reports for the Month ending May 31, 1914.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| England— | | | | | | | | | | |
| Birmingham | 35·60 | 0·18 | 4·79 | 15 92 | 1·71 | 7·26 | 29·86 | 2·99 | 1·57 | 0·48 |
| Exeter | 41·80 | 0·05 | 2 37 | 3·56 | 0·79 | 1·97 | 8·74 | 0·77 | 0·31 | 0·00 |
| Kingston-on-Hull | 44·61 | 0·16 | 3·86 | 4·51 | 2·50 | 3·39 | 14·42 | 1·74 | 0·52 | 0·05 |
| Liverpool | 56·14 | 0·16 | 4·11 | 8·96 | 2·47 | 4·94 | 20·64 | 3·37 | 0·72 | 0·22 |
| London— | | | | | | | | | | |
| Embankment Gardens | 21·47 | 0·61 | 7·18 | 6·51 | 0·86 | 2·62 | 17·78 | 1·09 | 0·30 | 0·01 |
| Golden Lane | 46·74 | 0·08 | 3·37 | 5·72 | 1·68 | 3·74 | 14·59 | 2·40 | 0·65 | 0·18 |
| Meteorological Office | 35·20 | 0·05 | 1·57 | 2·96 | 0·00 | 2·11 | 6·69 | 1·14 | 0·82 | 2·09 |
| Malvern | 34·76 | 0·02 | 0·27 | 0·41 | 0·69 | 1·25 | 2·69 | 0·59 | 0·18 | 0·02 |
| Newcastle-on-Tyne | 29·19 | 0·12 | 3·18 | 5·56 | 0·93 | 1·93 | 11·72 | 1·37 | 0·25 | 0·04 |
| York | 33·73 | 0·02 | 0·85 | 3·15 | 1·08 | 1·35 | 6·45 | 0·91 | 0·38 | 0·10 |
| Scotland— | | | | | | | | | | |
| Greenock | 52·30 | 0·04 | 1 93 | 4·51 | 1·39 | 2·25 | 10·12 | 1·01 | 0·22 | 0·82 |
| Leith | 46·10 | 0·49 | 0·79 | 2·92 | 1·19 | 1·19 | 5·32 | 0·98 | 0·18 | 0·09 |
| Paisley | 49·68 | 0·15 | 4·53 | 6·66 | 1·20 | 1·99 | 14·55 | 0·89 | 0·35 | 0·02 |

Col. 3 includes all matter insoluble in water but soluble in $CS_2$. Col. 4 includes all combustible matter insoluble in water and in $CS_2$. Col. 5 includes all earthy matter, fuel, ash, &c. One metric ton per square kilometre is equivalent to (*a*) approximately 9 lbs. per acre; (*b*) 2·56 English tons per square mile; (*c*) one gramme per square metre; (*d*) 1-1000th millimetre of rainfall (see col, 2).

**Gas or Oil for Boiler-Firing.**—Attention is called in the "Engineer" to the Brünler system of steam-boiler firing, the novelty of which consists in the use of a high-pressure gas or oil jet submerged in the water of the boiler. Descriptions of the invention which have appeared in the German technical papers set forth that hitherto, and by all present methods, the heat of the fuel is transmitted to the water through the walls of the boiler. This involves considerable losses of heat and material. It is stated that the Brünler method of submerged firing, which eliminates these losses, has been used with great success in a German chemical factory. The boiler plant consists of a cast-steel generator, in which the flame burns under the surface of the liquid, and of a cast-iron collector for the liquid, the steam, and the gaseous products of combustion. The fuel used is coal-tar oil.

# BRITISH COMMERCIAL GAS ASSOCIATION.

## Third Annual Report and Accounts Submitted and Adopted.

THERE was held last Tuesday afternoon, at the Institution of Mechanical Engineers, Storey's Gate, S.W., the third annual general meeting of the Association. The proceedings were of a brief and formal character, and consisted mainly of the adoption of the report and accounts. Bailie THOMAS PAXTON, of Glasgow (the President), occupied the chair, and referred to the considerations which had led the Committee to hold no annual conference this year, and to postpone the visit to Glasgow until 1915. It was stated in the report that the retirement of the President would also be postponed until that date, as well as that of the members of the General Committee who would in the ordinary course have retired this month and have then been eligible for re-election. In all the circumstances a large gathering was not expected; but the sixty or seventy gentlemen present were fully representative of the members of the Association.

It was in the first place agreed to take as read the minutes of the last meeting.

### FROM THE PRESIDENT OF THE INSTITUTION OF GAS ENGINEERS.

The SECRETARY (Mr. W. M. Mason) read a letter which had been received from Mr. John Bond, of Southport, the President of the Institution of Gas Engineers. In it, Mr. Bond said he very much regretted that he was unable to attend the meeting, as he had an important Gas Committee meeting at Southport on the same day. He added: "I am satisfied that the Association's advertising campaign has promoted keen public interest in the uses of gas for domestic and commercial purposes; and I am convinced that the Association will be adopting the right policy in proceeding with the full publicity campaign during the next year. I shall be pleased if you will convey to the President my great appreciation of the valuable work which has been done by the British Commercial Gas Association during his year of office." The Secretary also read a number of other letters of apology for absence.

The PRESIDENT, referring to two of these, said that Mr. R. S. Hilton, of Birmingham, had been called up, and was serving his country in a military capacity. In regard to Mr. Robert Watson, they were all sorry to learn that he was ill. As they were aware, Mr. Watson was a warm supporter of the Association, and had done very good work for it.

### A STATEMENT BY THE PRESIDENT.

The PRESIDENT said he saw it mentioned on the *agenda* that a statement was to be made by the President. But after reading through the splendid and skilfully drawn annual report, he did not think there was anything special for him to add. Prior to the 4th of August, they had anticipated great things from their annual conference, which, as those present knew, it had been arranged should be held in Glasgow during the present month. The Association very wisely, in his opinion, postponed the whole thing for twelve months. This, it seemed to him, was very good policy indeed, because, strange to say, on the very day on which their exhibition and their conference were going to be held, 3000 Belgian refugees reached Glasgow, and everyone was called upon to take a hand in providing for these unfortunate people. In all the circumstances he was perfectly satisfied that the right thing was done in simply postponing the conference for a year. ["Hear, hear."] Some people said they should call a halt entirely. He, however, was not one of them. They should, he thought, go full speed ahead; and the Executive of the Association had fallen in with this idea. He did not say that the suggestion came from him in the first place; but he supported it most strongly, and the Executive, he believed, were unanimous in agreeing that the advertising should go on, and not be postponed as the conference and other things had been. Now, what had he to say to them regarding the work of the Association? There had already been two meetings that day—a meeting of the Executive, and one of the General Committee; and he was perfectly safe in saying that all the reports which came up at these meetings were of a most satisfactory description. They were adding to the number of their subscribers, and they were adding to their funds. Some more gas undertakings had now agreed to subscribe on the full basis, while others had become members at a modified rate. They must hope that in the near future they might have practically all the gas undertakings in Great Britain represented in the Association. Instead of, as mentioned in the report, 79 per cent. of the gas sold, let them have 100 per cent., and so complete the thing. In all parts of Great Britain there had been a very marked increase in business; and he was one of those enthusiasts who believed that, while they could not attribute all the success of the gas undertakings to the work of the British Commercial Gas Association, they were entitled at least to say that in great measure the Association had stimulated the business of the gas undertakings, and the increased output of gas was due to the efforts made by the Executive of the Association. In regard to this matter, too, it was safe to say that, if they had a thing to sell, they must advertise it, or they could not dispose of it at all. He believed that both those who were members of the Association and those who were not already members would do all that they could to encourage the Executive in pushing the business they were engaged in. ["Hear, hear."]

### THE REPORT AND ACCOUNTS.

Mr. F. W. GOODENOUGH (Chairman of the Executive) then presented the annual report (as amended*) and the accounts, and moved the following resolution: "That the report of the General Committee, together with the statement of accounts submitted therewith and the recommendations of the Executive for dealing with the situation created by the outbreak of war which were adopted by the General Committee, as set out in the report, be approved and adopted." He said the report and accounts were only now in the hands of those members present who were not members of the General Committee, as the report had only been adopted by the General Committee, with amendments, at their meeting that morning. He would like to say a few words in explanation of the fact that the Association had spent in advertising during the past year £1800 less than in the previous financial year. This was due to the fact, in the first instance, that in the previous year they had brought forward a large sum—between £4000 and £4500—from the first year's working, which was not a full year in expenditure, while it was a full year in receipts; and the Committee therefore deliberately spent £2400 more during the year ended September, 1913, than they had received, because it was not necessary to hoard up the money, and because it was desired to make as good a return as possible for the money that had been contributed, in the hope of bringing in further support to the Association. This and other factors resulted in the subscriptions for the past year being £1000 over the receipts for the previous twelve months, which would have enabled them to spend up to £1400 less than in the corresponding period, and still to keep on the right side of the hedge. Then they did better on their sales account to the extent of about £450 than was the case the previous year; the loss on the distribution of literature (less the receipts from sales) having been only £58, as against £500 the preceding year. The administration expenses, too, had been carefully looked after, and were £40 less than in the corresponding period. But against this they had to set a necessary contribution towards the deficit on the National Gas Exhibition; the net result being that they were only able to spend £15,000 on advertising, instead of £16,800 as in the previous year. It was unfortunate that they should have had to find any money towards the deficit on the exhibition. It was quite hoped that they would have been able to clear the whole of the expenses out of the contributions specifically made for this purpose. But the work of the exhibition was essentially identical with, and complementary to, the work of the Association; and the amount of publicity that they obtained in the newspapers at the time of the exhibition was certainly worth a good deal more than the £3000 deficit, if the Association had to find the whole of this amount. It was safe to say that no commercial exhibition was ever better noticed in the newspapers than was the National Gas Exhibition, thanks mainly to the organization of the Editorial Department; and certainly £10,000, or even £20,000, would not have bought the space that they were then given in the public Press. So that the Association were undoubtedly spending money on their legitimate objects in contributing to clear off the exhibition deficit. Money was still coming in towards the deficit from some of the 1000 gas undertakings that had not yet subscribed anything to it; and it was hoped that, by persistently bringing the matter before the notice of the whole of the undertakings of the country, they might eventually get at least a substantial proportion of the deficit cleared off by them. It was rather striking that, out of the 1600 gas undertakings in the country, there were about 500 who would always support any co-operative movement for the benefit of the gas industry, and there were about 1000 who never would. The lists of subscribers to the British Commercial Gas Association and of subscribers to the National Gas Exhibition were almost identical. At times, he was sure, they all felt some impatience with a situation such as this; but the expression of impatience would not bring other gas undertakings to their side. They had to go patiently on giving these undertakings steady proof that the work which was being done was worthy of their support; and evidence that this proof was being driven home all over the country was to be found in the fact that within two years the number of gas undertakings supporting the Association had exactly doubled. He did not think they need fear that this number would not go on increasing steadily, as they continued to give proof of what good they were able to do for the industry. The President had referred to the decision of the General Committee adopting a recommendation of the Executive that business should be carried on this year as before. It was hoped that this determination would be supported unanimously by the members of the Association throughout the country, so that the necessary income might be forthcoming. Otherwise, with all the resolutions in the world, the Association could not

* See last week's issue, p. 185.

carry out their policy. He would ask the members to get their undertakings to send in as soon as possible their contributions for the ensuing year; and he would do so for two reasons. One was that the administration would then know that they were assured of their income; and the other was that they would thus be in possession of the necessary working capital for conducting their business. As would be seen from the accounts, the balance in hand, of just under £2000, was more than swallowed up by the stock of literature (about £2500); so that the cash position of the Association was always rather tight, and they were glad to have contributions in the early part of the year rather than later on. He would make this appeal to the Society of British Gas Industries, as well as to the gas undertakings. He need say nothing in support of the policy of carrying on business as usual, more than had already been stated in the "Bulletin" and by the President, except to emphasize the fact that there was great value in continuity of business and policy with an Association like theirs. They all knew that it had not been easy to get some undertakings to join; and if they once slackened off, it would be hard to get up steam again. Getting the initial momentum into a machine was always one of the most difficult things about it; and so they did not want to let their machine run down. He would also like to emphasize the appeal made in the report for an increase in the number of associate members. Now that District Conferences were being held all over the country at different times, the associate members of the Association got more value out of the work than before; and it was hoped that there would be a large increase of membership from among the juniors. If seed were sown in the minds of the juniors, when they became seniors and managers in charge of undertakings they would very often be acting as missionaries for the Association among non-subscribers. He would add that the General Committee were taking steps to try and bring about more cordial co-operation between the gas industry and the ironmongers, plumbers, and gas-fitters throughout the country. A preliminary meeting had been held that very morning; and it was hoped that by the time their conference was held in Glasgow next year there would be some substantial progress to report in this respect. The members might also be interested to know that the Association were sending a supply of playing-cards, bearing on them their advertisements, to the hospitals of the country, and were also forwarding a supply of matches, similarly bearing the Association's advertisements, to the troops at the front. It was felt that this was about as good a form of advertising as they could spend money on at the moment.

Mr. S. Y. Shoubridge (Lower Sydenham) seconded the motion, remarking that the exhaustive speech of the Chairman of the Executive left him little to say. He was, however, glad of the opportunity of seconding the resolution, because he thought the report was one with which the Executive Committee and the members generally had every reason to be satisfied. It was a record of progress all along the line. There was an increase of membership, an increase of subscriptions, and the Association certainly had increased their usefulness to the gas industry. If they had not increased their membership and income at the rate that could have been wished, this was not to be wondered at, when one remembered that all great and useful things were of very slow growth. He would also like to say that, as Treasurer, he had been extremely pleased to see the great care and attention which was bestowed upon the accounts—the extreme accuracy with which everything was set forth. The Association were to be congratulated upon the fact that the head of the spending department came from a country where extravagance is counted a crime and frugality is a national virtue.

### A Renewed Invitation to Glasgow.

The President said he desired to extend to the members a very cordial and hearty welcome to Glasgow in the autumn of next year. He was authorized to say that the authorities in the city regretted that it had been impossible to carry out the conference as originally arranged, but that next year (the General Committee having agreed to postpone the conference) they would be delighted for the Association to visit Glasgow, and to do what they could to entertain the members, if not to educate them. In Glasgow, they thought they sometimes led—at least, they often made themselves believe so. He was speaking to a man the other day in London, and asked, "Why do the English not love Scotch working men very well?" The reply was, "They have nothing against them further than that they all want to be foremen." [Laughter.] However, be that as it may, they expected the members to come to Glasgow next year, and would, as he had said, do their best to entertain them.

Discussion of the report was then invited, but no comments were forthcoming from members, and the resolution which had been proposed by Mr. Goodenough was unanimously adopted.

### The President's Services Acknowledged.

Bailie J. A. Lindsay (Edinburgh and Leith) said he had come all the way from Scotland, and had been asked to propose a vote of thanks to Bailie Paxton for having come from Scotland, for having given them this kind invitation, and for having occupied such a very important position with regard to the work of the Association. He had great pleasure in proposing this vote, which he felt sure would meet with their hearty approval. It was unnecessary for him to dwell upon the great services which the President had rendered to the Association. No doubt, in Glasgow they thought they sometimes led; but in Edinburgh they thought they often led. [Laughter.] In this particular case, however, Glasgow did lead, and influenced Edinburgh to follow the example; and he thought the example which Bailie Paxton and his Corporation set might be followed wisely and well by other Scottish corporations in a greater degree than had yet been done. ["Hear, hear."] There was just one thing he felt sorry for. This was that the last time he discussed the British Commercial Gas Association with Bailie Paxton that gentleman undertook to endeavour to get Aberdeen and Dundee to join the Association. The President had not yet done this; but he (the speaker) hoped that before he relinquished office it would have become an accomplished fact. The only way in which it could be done was by means of skilful bombardment; and he did not believe that there was any man better fitted to bombard the two cities than was Bailie Paxton. They had just heard the President say that English people did not like Scotch workmen very well, because they all wanted to be foremen; but he was sure that both Scotch and English were delighted that Bailie Paxton had been their President during the past year, and had seen his way to retain this office during these trying and critical times. While they had been deprived of the pleasure they had been looking forward to of visiting Glasgow this year, they could cherish the hope that—barring accidents in the municipal elections next month—they might have the opportunity of attending as the guests of the Corporation of Glasgow next year, when nothing would cause himself and the other members greater delight than that they should then be welcomed by Lord Provost Paxton. [Applause.] This was quite on the cards—he was not giving away any great secret—and he was sure they would all be gratified if on such an important occasion they met the Lord Provost of Glasgow in the person of Bailie Paxton.

Mr. W. D. Helps (Leeds) said he had great pleasure, as having journeyed about half the distance of their friends the President and Bailie Lindsay, in seconding the vote of thanks. They all knew that Bailie Paxton was a good man to preside, and they all knew that he came from Glasgow, where nobody thought of anything but education and hospitality. If there was one thing that Glasgow did well in, it was hospitality; and with Bailie Paxton in the position that had been referred to, they would no doubt be doubly well dealt with in this respect.

The vote was heartily accorded, and briefly acknowledged by the President.

### The Committees and Officers Thanked.

Mr. F. P. Tarratt (Darlington) said it was with great pleasure that he rose to propose that the thanks of the meeting be given to the Committees and officers of the Association for their services during the past year. He trusted they would not feel in any way set-back by the mere fact of the annual conference having been postponed. From what had been said, it was evidently only a pleasure deferred. Of course, they looked to the annual conference to represent something of the zeal thrown into their labours during the previous year; but unfortunately on the present occasion this had to be put off. He was, however, none the less sincere in saying that the members fully appreciated the heavy duties that had fallen upon the administration—more especially the Chairman of the Executive, Mr. Goodenough, and their able Secretary, Mr. Mason. He hoped they would continue to regard the non-subscribing companies and corporations in the same way as in the past, and treat them patiently. Nothing was to be gained by pushing things. They must come in in the long run. The Association must be gratified that they were not losing members. They must ultimately get a larger proportion as subscribers, as undoubtedly benefits had been reaped from the efforts of the Association. It was only right that in the ensuing twelve months they should continue business as usual. Though he had no doubt, as the Committee had said in the report, the advertising would be on somewhat different lines, it would be quite in order. In the matter of advertising like this, continuity was the chief thing. They must continue in the way first started upon, and keep their wares before the public.

Mr. A. P. Main (London) seconded the vote, which was heartily passed.

Mr. Goodenough, in returning thanks on behalf of the Executive, said the Committee greatly appreciated the kind expressions of Mr. Tarratt. Their work was only a labour of love, and they felt fully repaid for any efforts put forth by the appreciation shown at each succeeding annual meeting. He would like to add his testimony and his thanks in regard to the work of the officers of the Association during the past year. It was almost unnecessary for him to say anything as to the work of their indefatigable Secretary, and their enthusiastic and always hard-working Editor (Mrs. M. A. Cloudesley Brereton), who did so much very valuable work for the Association in many ways of which members themselves could hardly be conscious. Then there was their able Advertising Agent, Mr. Sykes, who had given them the very best of services from the time when he undertook to organize the advertising from the advertising expert's point of view. The Association constantly had complimentary references to their advertising made in the Technical Press whose business it was to criticize advertising; and this reflected very considerable credit upon their Agent and upon the Editor, who had much to do with the preparation of the copy from the point of view of the woman of the house and the public generally. The thanks of the members should be given to them in unstinted measure for the way in

which they carried out their duties. The Association were to be congratulated upon having such officers on their staff.

Mr. MASON, responding for himself and the other officers, remarked that he could honestly say the team in their Association pulled together. It was a tremendous thing to feel that work was appreciated, and this was certainly the case in their Association—not only by the Executive, but also by the General Committee and the members. He would like to say personally how much he was indebted to his staff for the support they gave him—particularly his assistant, Mr. Walker. No man could do the work that he might do unless he was supported; and in this Association all the officers were admirably supported.

The PRESIDENT said they were much indebted to the Council of the Institution of Mechanical Engineers for the privilege of holding the meeting in their handsome hall; and he proposed a hearty vote of thanks to them.

Mr. D. MILNE WATSON (London) seconded the proposal, which was unanimously agreed to.

This concluded the business of the meeting.

## MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

### Quarterly Meeting in Manchester.

The One Hundred and Seventy-First Quarterly Meeting of the Manchester District Institution of Gas Engineers was held at the Grand Hotel, Manchester, on Saturday. Owing, doubtless, to the war, there was a comparatively small attendance.

Mr. J. G. NEWBIGGING, M.Inst.C.E., the Engineer of the Manchester Corporation Gas-Works and President of the Institution, occupied the chair, supported by Messrs. Edward A. Harman, M.Inst.C.E., of Huddersfield, and Walter Whatmough, of Heywood (Vice-Presidents), and Mr. Edward Allen, of Liverpool.

The PRESIDENT, in opening the proceedings, said he was very pleased to see such a good attendance, especially as they had no programme on commercial matters, and only formal business. The Committee took into very careful consideration what should be done at this meeting; and though they had a "half-promise" of a visit to a works (where they could have seen something of great interest), they thought it better not to accept it on this occasion. The war seemed to concentrate all their thoughts, and some of them had extra responsibilities; so the Committee thought it better to confine the business to the ordinary procedure, and defer business discussions to another meeting.

The HON. SECRETARY (Mr. G. S. Frith, of Runcorn) read the minutes of the last meeting, which were passed.

#### DEPARTED MEMBERS.

The HON. SECRETARY (proceeding) said he regretted to announce that since the last meeting they had lost two members—Mr. Thomas Newbigging, D.Sc., and Mr. John Chew. Mr. Newbigging was elected a member as far back as 1878, and was President the following year. He was Hon. Treasurer from 1883 to the time of his death. Mr. Chew was elected in 1874, and occupied the presidential chair seven years later.

The Committee had passed resolutions of sympathy with both of the families referred to; and the members signified their formal approval by passing votes of condolence in silence.

#### ELECTION OF NEW MEMBERS.

The following new members were introduced to the meeting: Mr. John Brabbs, of Bollington, near Macclesfield; Mr. R. H. Garlick, of Salford (from associate to full member.)

#### OFFICERS RE-ELECTED "EN BLOC."

The PRESIDENT read the proposal on the *agenda* which recommended that "the President, together with the other officers, and the Committee, be re-elected *en bloc* for a further period of twelve months." In this connection, he desired to state that the Committee of the Institution had decided to ask their old friend, Mr. Braddock, of Radcliffe, to take the position of Honorary Treasurer. He thought it was an honour which Mr. Braddock well deserved. He was one of the founders of the Institution—a man who occupied the presidential chair in 1894—and had with very rare exceptions been present at their meetings. It was only right to elect him to this position; and they heartily welcomed him to it. The President followed up this statement by remarking that he would like one of the members present to propose the motion that the officers, &c., of the Institution should be re-elected *en bloc*.

Mr. EDWARD ALLEN (Liverpool) said he had great pleasure in doing so. He thought there could be only one opinion on the matter, and that was that, as a Committee, they had acted very wisely in "marking time." In the recommendation which they had made in this respect they were only following the example of other important bodies. The British Commercial Gas Association was a particular case; and he thought they were taking a very wise and proper course. He heartily joined with them in the appreciation they had bestowed upon Mr. Braddock, and he trusted he would have long service in the office of Honorary Treasurer.

Mr. S. MEUNIER (Stockport) seconded the resolution, and remarked that the attitude of the Committee in re-electing the officials *en bloc* was a perfectly proper one.

#### THE PRESIDENT'S AND TREASURER'S REPLIES.

The PRESIDENT said that, on behalf of himself and the other officers, he thanked them for the re-election. Personally, he would have been satisfied if the business had gone on as usual, and Mr. Harman had succeeded him. However, he would be pleased to serve another year, and hoped that at the February meeting they would be able to go on with the customary business. In this connection, they asked for offers of papers. They were not doing enough technical work; and there was plenty of scope now for papers which would be of benefit to them all round. He hoped that at the next meeting they would have good technical fare.

The HON. TREASURER (Mr. James Braddock, of Radcliffe) said it would not be becoming of him if he did not say a few words in acknowledgment of the great honour they had done him that afternoon. He could not but think it arose from the good and kindly feeling which had always existed between himself and the members of the Institution, whose progress he had watched for 44 years—and not only "watched," but watched with very sustained interest. The office of Hon. Treasurer carried with it a seat at the Committee meetings; but he could not hope to bring to the deliberations a tithe of the ability which his distinguished and revered predecessor (Mr. Newbigging) had brought. However, whatever he could do he would do willingly.

#### NATIONAL RELIEF FUNDS.

The PRESIDENT, having drawn attention to an item on the *agenda*—"That contributions of ten guineas each be forwarded to the Prince of Wales's National Relief Fund and to the Belgian Relief Fund,"

Mr. H. KENDRICK (Stretford) said he had pleasure in proposing that these contributions be allocated. They could not properly allocate the amounts to local funds, and it was far better to send their contributions to the national organization.

Mr. C. POTTS (Hyde) seconded the motion, which was supported by Mr. W. S. HADDOCK (Warrington), and passed unanimously.

#### UNIVERSITY LECTURES.

On the motion that the grant to the Manchester University lectures be the same as the previons year—£15,

Mr. GARLICK proposed that the amount be reduced by £5 seeing that there were only three lectures announced for this session, instead of five. The other £5 might be given to the fund for the Belgians.

The PRESIDENT (intervening) said Mr. Garlick was out of order. They could not deal with the question now.

Mr. GARLICK: Well, I will put it as an amendment that the amount be reduced by £5.

The PRESIDENT: No; it falls to the ground. There is no seconder. The proposal before the meeting is that £15 shall be granted towards the cost of the Manchester University lectures.

A show of hands was taken, and revealed one dissentient.

Mr. S. MEUNIER (Stockport) said that, as the Treasurer of the University Lectures Fund, he was glad to take this opportunity of thanking the members of the Senior Association for their support towards the cost of the lectures. He assured them that their financial help had done a great deal of good. He quite agreed with Mr. Garlick that the number of lectures had been reduced; but the Manchester Junior Association were doing good work, and their members were striving to strike a higher note for the good of the profession to which they belonged. There might come a time when this item would be deleted. Some of the members, he granted, were, at the first blush of the movement, very "warm" on the subject, and afterwards they became "lukewarm." By advice and precept they could overcome this difficulty.

#### THE BENEVOLENT FUND.

Mr. KENDRICK alluded to the reports that had appeared in the Press relating to the meeting of subscribers to the Gas Institution Benevolent Fund. He believed that money was coming in very badly.

The PRESIDENT said subscriptions, however small, would be welcomed. He thanked Mr. Kendrick for bringing this matter before the members, and hoped that non-subscribers would make a note of the fact.

Mr. T. DUXBURY (Oldham) assured the members that the fund was a deserving one. He had investigated some of the claims, and could honestly tell them that this was a fund which ought to be better supported than it was. If the Council of the Manchester Institution could take the matter up, and "get at" every member individually, there would be more practical good come out of it. He suggested that a special appeal be made to the members in this connection.

The PRESIDENT said he quite agreed with Mr. Duxbury's suggestion. The Technical Press would, no doubt, record the matter, as it was one of importance.

Mr. WHATMOUGH said he remembered a special appeal being made five years ago; and they then had a splendid response. He thought the best plan would be to increase the subscription of the Institution by 2s. 6d. a year, and allocate the money for the Benevolent Fund. This plan would obviate the matter being brought up so often.

### The Position of the Tar Market.

Mr. Meunier (as Chairman of the Manchester District Institution Commercial Section) asked to be allowed to allude to the present position of the tar market. As they all knew, the war had largely stopped the export of pitch. The Tar Distillers' Association in the original instance had suggested that the tar produced should be taken as usual and worked up, but not paid for until the end of the war. The Lancashire distillers did not, however, think this altogether reasonable, and approached the Committee of the Manchester District Commercial Section, and submitted to them amended suggestions. These were that payment should be made for the value of the liquid bye-products after deducting the usual discount and working expenses. The Committee, after full discussion and consideration, thought that this was not sufficient, and that a certain proportion of the value should be paid on account of the pitch. These terms were submitted to the Lancashire tar distillers. The Committee, however, considered that the matter was one of importance to the industry; and they communicated with other District Associations, and, in conjunction with them, approached the Institution of Gas Engineers, whose Emergency Committee convened a meeting in London. This was a meeting of the whole of the Commercial Sections; and it was decided that, as a general principle, the basis suggested by the Manchester district to the Lancashire distillers was fair, and should, as far as possible, be adopted throughout the kingdom. They had, further, formed a Special Committee to negotiate these terms with the tar distillers. The Committee met in London on Monday last; but in the view of the non-receipt of a reply from the Tar Distillers' Association to the circular sent out to them, it was further decided to notify all the tar distillers personally, and as many of the coke-oven producers whose names were obtainable, to attend a meeting on Friday next (Nov. 6), with a view to a discussion of the whole scheme. It had come to the knowledge of the Committee that some pitch had been sold recently at a much lower figure than had been suggested as a fair basis by the Lancashire tar distillers, in whose offer of terms it had been stated that they were prepared, on the resumption of export, not to sell pitch at a lower figure than was obtainable on Aug. 1 last without the consent of the tar producer. In view of these sales, it could be realized that the tar producers would have to give such consent and so sacrifice, maybe, anything from 10s. to 15s. a ton. This, of course, would make a great difference to gas departments.

The meeting then terminated, having lasted less than an hour.

## MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

### Quarterly Meeting at Birmingham.

The Autumn General Meeting of the Association was held last Thursday at the Grand Hotel, Birmingham. The war having caused a great drain on the various staffs of gas undertakings, consequently compelling the closer attendance of managers to their duties, the public proceedings were not much more than formal. Mr. W. J. Rendell Baker, of Mansfield, the President, occupied the chair.

### The Late Mr. Adam Cooke.

The President proposed a vote of sympathy with the relatives of the late Mr. Adam Cooke, of Oldbury, and said he was a very old member of the Association; his record going back twenty-one years as a member of the Association, in addition to which he was a Past-President and a Past-Secretary. This was the fourth occasion during his (the President's) year of office that he had proposed votes of condolence with relatives of deceased members. At the spring general meeting at Mansfield he suggested that he should send a telegram to Mr. Cooke hoping that he would get better and soon be among them again. In reply, he received a "most dear" letter from him thanking the members for their kind thoughts of him. The medal which he (the President) was now wearing was presented by Mr. Cooke to the Association. They had recorded their appreciation of his work in the various capacities in which he had served the Association. While Mr. Cooke was in the chair there was one thing he did not forget—that was the widows and orphans, and he was constantly agitating in favour of strengthening the Benevolent Fund.

The resolution was carried by the members rising.

### Election of Officers.

The Secretary said that as no nomination had been received from the general body of members for the vacancies on the Committee and also for the officers of the Association, the Committee themselves submitted the following nominations:

*President:* W. J. R. Baker, of Mansfield.
*Vice-President:* C. H. Webb, of Stourbridge.
*Hon. Treasurer:* W. R. Cooper, of Banbury.
*Hon. Secretary:* W. G. S. Cranmer, of Willenhall.
*Auditors:* J. Brettle and R. H. Ainsworth.
*New Members of the Committee:* P. G. Winstanley, G. Stevenson, and T. H. Hack.

[The members of the Committee retiring this year were: Messrs. W. C. Jones, J. R. Heath, and J. M'Coll.]

Mr. Jones proposed that the recommendations of the Committee be accepted; and this was seconded by Mr. J. C. Bennett and carried.

Mr. W. Langford, of Longton, was appointed a member of the Committee to fill the vacancy caused by the death of Mr. Cooke.

### New Members.

The following new members were elected: Messrs. Percy Dougall, of Kidderminster, R. S. Ramsden, of Burton-on-Trent, R. A. S. Browning, of the Adderley Street Gas-Works, Birmingham, W. H. Johns, of West Bromwich, R. J. Meiklejohn, of Rugby, A. J. Green, of Market Drayton, W. Gregson, of Cannock, and J. F. Tyndall, of Whitchurch.

### Commercial Section.

The Secretary explained that the Commercial Section had been considering the matter of the rules, and they had carried out a number of revisions which they now submitted for the approval of the Association. The qualification for membership had been altered. The original rule stated that only members of the Association should be eligible for membership of the Commercial Section; and it gave power to any member to send a deputy if he was unable to attend. The amended rule, however, provided that nominees of gas undertakings in the Midland district should be eligible for membership as well as members of the Association. The subscription remained the same; but works up to 25 millions per annum would be entitled to two representatives, and works over 25 millions to three representatives. Previously there was one representative only. It was proposed that where a third representative was sent the subscription should be increased by half-a-guinea. The new rule with respect to meetings was that general meetings of the members should be held not less than once a quarter in Birmingham or some other convenient centre as might be decided by the Committee, at which all matters referring to the commercial side of the business might be discussed. The original rule regarding the returns which had to be submitted stated that they should be sent in fortnightly, and it enumerated the particulars which were required. The new rule said "may" instead of "shall," and it provided that there should be included in the return particulars as to residual products instead of coke only; the idea being that later on prices for residual products should be given. There was also a new rule which provided that tabulated lists would only be sent to those members who had sent in their return under Rule 6. As regarded the general management of the Association, that remained as it was. Another rule was one providing that an annual general meeting of the Association should be held in January or February in each year, and that at this meeting two members of the Committee should retire, who would be eligible for re-election. He thought he had mentioned all material alterations, but a member pointed out that he had omitted to notice the change in the title of the Commercial Section which henceforth was to be known as the "Midland Commercial Gas Association, affiliated with the Midland Association of Gas Engineers and Managers."

As the matter had not appeared on the *agenda*, it was decided that the revised rules should be printed and circulated, so that members might have an opportunity of considering them, and the question would be brought up again at the next meeting for approval.

### An Honorary Member.

The Secretary reported that the Committee had paid a tribute to Mr. R. O. Paterson's long connection with the Association by electing him an honorary member. In a letter acknowledging the honour conferred upon him, Mr. Paterson said he greatly appreciated the kindly feeling exhibited towards him, and he asked that his heartfelt thanks should be conveyed to the members.

## OTTAWA GAS COMPANY'S NEW PLANT.

At the close of the address of the President of the Canadian Gas Association—Mr. A. A. Dion, the General Manager of the Ottawa Electric and Gas Company—at the recent annual meeting in Ottawa, he gave the following particulars of the new auxiliary gas plant of the Company which was visited by the members.

The block of land on which the plant is being built is rather more than 6 acres in extent. It has a frontage of 1566 feet and a depth at the west end of 440 feet, tapering to a point at the east end. The shape of the plot made it appear at first as though it would prove unsatisfactory for the purpose of the construction of modern gas-works; but preliminary studies showed that it would accommodate buildings, plant, and apparatus for a make of 6 million cubic feet of coal gas per day, with ample room for an additional water-gas plant of equal capacity—everything being laid out to good advantage, and the units as constructed from time to time necessitating no changes in the original location of the plant, &c., installed with the first unit, which was to be a coal-gas plant of a capacity of 1½ million cubic feet per day.

### Coal-Store and Retort-House.

The coal-store consists of a brick building, 100 feet wide by 155 ft. 9 in. long and 40 feet high, constructed of steel framing

with brick-filled walls and a concrete roof. Coal is dumped from cars into a sloping pit extending into the coal-shed, and is carried to storage by a man-trolley telpher system with a grab bucket of one ton capacity, which will take coal from the pit and distribute it throughout the house, and reclaim from storage to hopper over a breaker and conveyor leading to the retort-house. By this arrangement, coal will be put into the stores without breaking, which is a very desirable feature, as it lessens the liability to spontaneous combustion, and reduces the loss of volatile matter in the coal.

The retort-house is constructed of steel framing with brick curtain walls and a metal roof. The benches are of the Glover-West vertical type, consisting of six settings of eight retorts each; the rated generating capacity of each bench being 300,000 cubic feet per day, or 1,800,000 cubic feet in all. Coal from the storage building is first passed through a breaker in the coal-store, then conveyed to the hoppers over benches by a gravity bucket conveyor. The capacity of the coal hoppers over the benches is 24 hours' supply for all retorts. The coal from the hoppers drops into the feeding chambers over the retorts, and is continuously fed into the retorts by gravity alone. At the bottom of each retort there is a coke collecting chamber, which is emptied at stated times by the opening of a lid on the chamber; the coke falling into a shoot leading to a conveyor running under the benches to the east end of the house, where it drops into a hopper feeding a cross conveyor-elevator, which transfers the coke to the top of the house. This conveyor-elevator delivers coke to a hopper above the retort-bench stack for storing coke for use in filling the retorts after scurfing, also to a hopper for filling the producer furnaces, and the rest to the coke-screening plant above the coke-storage bins adjoining the retort-house. The breaker and screening plant sizes the coke, and three bins or hoppers—one containing screenings, one small coke, and one large coke—underneath the screen, hold the coke, which is loaded into waggons or trucks direct through shoots operated by the man in charge. Should a surplus of any grade of coke accumulate, a man-trolley telpher-grab bucket system removes it, and drops it into the yard beyond the retort-house, picking it up again when necessary, and delivering it back into the storage-bins, or dropping it directly into trucks as may be desired. By the use of this system, practically none of the coke produced has to be shovelled.

### Condenser, Exhauster, and Purifier Houses.

The condenser and exhauster house is of solid brick construction with corrugated asbestos roofing. The equipment of this house consists of a primary water-tube condenser, duplicate exhausters of the Mackenzie rotary type (one of them steam-driven, the other electric-driven), two secondary condensers, a Livesey washer, and one rotary scrubber-washer. The last is fitted so that several sections of the machine may be used as a naphthalene washer should it be necessary. The condensers are fitted with automatic temperature controls, whereby the temperature of the outgoing gases may be automatically maintained at any desired degree. The scrubber-washer is fitted with both electric and steam motive power, so that either may be used by simply operating a clutch.

In other respects the condensing and scrubbing plant follows generally accepted lines. The building is arranged to accommodate additional apparatus required for a second unit of 1½ million cubic feet daily capacity.

The purifier-house is also of solid brick with corrugated asbestos roofing, and is designed to accommodate purifiers to deal with 3 million cubic feet of gas per day. The first installation consists of four cast-iron purifiers in one block, each box being 25 ft. by 20 ft. and 10 feet deep, fitted with trays of the usual type, and Milbourne internal valves and connections. The oxide will be elevated from the ground floor to the roof by means of an enclosed elevator, and distributed to the purifiers by a spiral conveyor and canvas spouts. Provision is made underneath the boxes for revivifying the oxide.

### Meter, Governor, and Boiler Houses.

The meter and governor house is of solid brick, with concrete roof covered with tar and gravel, and is of sufficient size to accommodate additional units of 1½ million cubic feet capacity. The apparatus is of the usual type, consisting of a rectangular station meter and an 18-inch station governor.

The boiler and ammonia house is also of solid brick with corrugated asbestos roofing. The building is of sufficient size to accommodate boilers for the ultimate capacity of the plant. At present two 125 H.P. Robb boilers are installed, and the rest of the space will be utilized as a blacksmith's shop and pipe and fitting shop. The ammonia concentrating plant consists of a 42-inch Unger still, with preheating arrangement for the crude liquor.

### Storage Plant, Etc.

The holder is a three-lift one, of a total capacity of 1½ million cubic feet, and it is erected in a steel tank.

Other buildings are the water-gas generating house, the office and store-room, and the stable and waggon shed.

A complete system of tar and ammonia wells, water supply, steam-heating, drainage, &c., is in process of installation; and when the works are completed, it is anticipated that the equipment throughout will be up-to-date in every respect, and capable of manufacturing gas at the lowest possible price, when the high cost of materials for gas making at Ottawa is taken into account.

## AMERICAN ILLUMINATING ENGINEERING SOCIETY.

### Its Objects and their Achievement.

At the Eighth Annual Meeting of the American Illuminating Engineering Society, recently held in Cleveland (Ohio), Mr. Charles O. Bond, the President, made the following remarks on what he described as the two primary functions of the Society—viz., the collection of data, and the dissemination of information in regard to lighting.

### Collection of Data.

We have had numbers of papers printed on lighting installations, and several on practically identical lighting problems. The latter papers all had merit, yet they differed in the solution of the problem. To my mind it is from this point that our Society must push on to more definite information. We have not thus far officially stated our criteria of good illumination; and if we do not do so, then others will attempt to supply them, and our prestige will suffer. Having proper criteria, it should become possible to standardize the illumination for a fixed case, and to say from the requirements of that case: "This is the approved solution of your lighting problem, and the Illuminating Engineering Society stands at the back of it. You may rest assured that, until other improvements in light sources or light modifiers have arrived, what we now state to you stands as the final solution." Such an action would mark a distinct gain for the Society.

It will be said that there are not on earth two things precisely alike, and that illumination requirements cannot be classified. But there are rows upon rows of houses in Philadelphia where I would defy anybody to distinguish one from the other save by the numbers or through training; and there are probably 10,000 office rooms in New York City that might each have been made to the same mould. These offices should normally require even more variation in their day lighting than in their artificial lighting, owing to the directional exposure; but if we could unite in an agreement upon the proper lighting of just one of these, it would be so fairly typical of many others that a stand would have been taken on one definite type of installation.

It may be claimed that for five small rooms practically identical, five different dominant requirements exist. Very well. Let us still solve the five problems, each with as different a solution as is necessary, but with the accompanying statement of why each is right according to the criteria we have adopted.

With the idea of the necessity of a single concrete decision in mind, a Committee is under appointment to provide the best possible day lighting and artificial lighting for the Council room in the headquarters in New York City. Large numbers of rooms exist of which this is typical. What we desire to accomplish is to have, by all those who are qualified to judge on the subject, a common agreement with the Committee that, with the illuminants now at hand and the accessories as they now are or can be made, and with the office and its equipments as they exist, there shall have been put into effect in that single room in New York City the best obtainable illumination. To my mind this would mark distinct progress by the Society.

Some of our members are experimenting in their houses, perhaps in radically different directions, upon proper methods of illumination. We are all waiting and hoping that some definite eye-test will be produced which shall afford at least one of the necessary criteria for correct decision. For these reasons it will be thought by many that it is too early to presume to take a stand; but with me the belief is gaining solidity, after eight years of this Society's work, in which the same problems have been present from the beginning, that the taking of this definite step may be due not so much to lack of information or of methods of analysis as to a lack of courage. Every scheme which shall be suggested is susceptible of analysis; and when analysis is applied the different qualities sought are bound to arrange themselves in an order of desirability.

I predict that if the sample room in New York City is lighted in the best possible way, as agreed upon, it will become a Mecca for those who have long desired a definite stand by some one, and logically by us, in this matter. Out of it will grow other attempts and decisions by our Society until finally a bureau of information will have come into existence available to those of our membership who, by every consideration of justice, are entitled to gain such information at our hands.

### Dissemination of Information.

Now as to the dissemination of information and the growth of our Society through reaching new and larger audiences. When I speak of growth I do not necessarily mean growth in numbers but influence. What we seek is a wider publicity and acceptance of our message, and, if I may use the phrase, a more diffused publicity. To interest a person, we must teach him something new or something which he accepts as helpful. It is not a simple matter in these days to find new things to present, though old ones may, with occasional success, be presented in new fashion. It seems quite as difficult to secure the adoption by others of things which are helpful, because in order that a thing shall be helpful it must be incorporated into the habits or surroundings of another person's life. You can tell him the old thing in your dozen new ways,

but in so far as it reappears in his action you may have failed to cause so much as a hesitation.

There is an appeal, however, in which you will be imparting a new thing, because you will be saying it to a new individual, and that is by addressing yourself to a child. He is teachable; and the impressions which sink into his mind to-day remain the most vivid of his life. Every child who uses a piece of broken mirror to reflect the sun's rays into the eyes of people across the street is taking his first lesson in illuminating engineering. This is the time to catch him and to make your impression upon him. It should be the aim of the Society for this reason to put its primer* into the hands of every teacher in the United States, so that through them its principles may be instilled into the minds of these children. Through them you will succeed in getting a message into the homes of adults, even if you have failed a dozen times before.

Another means of extending our influence would be through a General Publicity Committee. I have noticed that during each year among the many papers which reach our "Transactions," some are of such value, through timeliness, point of view, or pioneer quality, that they are eagerly copied or reviewed in technical journals. This same subject-matter would have been keenly interesting in popular periodicals having a nation-wide circulation, had the text been popularized and properly condensed. It would expand the influence of our Society if in such cases, on the initiative of the Papers Committee, arrangements could be made between the author and a General Publicity Committee to have such a text prepared for these periodicals, in which due credit would be given both to the author and to the Society.

I have recently the word of a Japanese gentleman visiting in the United States, that Japan is soon to have an Illuminating Engineering Society. This we shall be glad to welcome into the sisterhood of such societies. We deplore the European War, which for a time will lessen the activities of our sister societies in England and Germany, and which may nullify the work of those who were laying the foundation of one in France. Because of the set-back in Europe of these societies, the duty lies more heavily upon us to keep our torch burning brightly as a beacon by which they may again make port when out of their sea of troubles, and as an evidence that within our own coast progress for them as well as for ourselves is still in the making.

* "Light: Its Use and Misuse." This useful little work was favourably noticed in the "JOURNAL" for Nov. 26, 1912.—ED. J.G.L.

## SPONTANEOUS COMBUSTION IN GAS-MAKING COALS.

### Views of American Investigators as to its Causes.

As a result of an extended inquiry into the subject of the causes of spontaneous combustion in coals, Mr. S. W. PARR, Professor of Applied Chemistry in the University of Illinois, with the collaboration of Mr. F. W. KRESSMANN, has arrived at the following conclusions.

*Kind of Coal.*—From the ignition temperatures given by Fayol, it may be seen that only those coals (such as lignites, bituminous and semi-bituminous) containing large amounts of volatile matter are liable to ignite spontaneously, and that anthracite, with its very low percentage of volatile matter, is practically entirely excluded. The results of the work of O. Boudouard, on the coking power of coals also substantiate this view; for in his work he found that the coals richest in volatile matter (carbo-hydrates, cellulose, &c.) were most liable to spontaneous combustion.

*Purity of Coal.*—The work of our [American] Government seems to indicate that coals of exceptional purity are more apt to heat-up than coals containing large amounts of extraneous matter. This is probably due to the fact that very pure coals are able to condense and absorb the oxygen of the air much faster than other coals, and so cause an increase in temperature, which finally results in the chemical combination of the oxygen and hydrogen occluded in the coal. This view is confirmed by the later work of Dennstedt and Bünz, who found that coals causing spontaneous combustion or those which oxidized and increased in temperature most rapidly were remarkably free from mineral matter as well as pyrites.

*Presence of Pyrites.*—As to what part sulphur compounds, especially pyrites, play in the spontaneous ignition of coal, opinions differ greatly. Some believe pyrites to be the leading factor, while others believe it plays no part at all, or if so, ascribe to it a position of minor importance, and believe its action to be merely a subsidiary one. The oxidizing action of the air upon pyrites is, however, admitted, and the notion seems to be fairly general and well established that pyritic oxidation tends to raise the temperature of the coal. On the other hand, it is seen from the work of Fayol, Dennstedt, and Bünz, Threlfall, and others, that coals containing pyrites in quantity too insignificant to be noticed are very apt to ignite spontaneously. Others, however, believe that the only influence of the pyrites is a mechanical one, in which the oxidation of the thin films of it in the coal serves merely to break up the coal.

*Temperature of the Coal.*—Most of the authors agree that the temperature of the coal is undoubtedly one of the main factors in the whole subject of spontaneous combustion, for cases have occurred time and again where probably they never would have occurred if there had not been an initial heating in some way or other. The New South Wales Commission think that the initial temperature of the coal at the time of storage or loading is one of the great factors in spontaneous combustion, the true danger of which has not heretofore been fully appreciated. Sources of heat seemingly insignificant are frequently the cause of bringing the temperature of the coal up to the danger-point, and so causing coals to ignite which under carefully regulated conditions of storage would not be at all dangerous. Numerous cases are on record where the cause of the spontaneous ignition of large coal stores and loads was finally traced-back to initial heating from flues, steam-pipes, or direct exposure to the sun. This increased temperature, whether coming from outside sources or from physical or chemical reactions within the coal, tends to accelerate the absorption of oxygen, and thereby to raise the temperature of the coal. It also tends to drive out the inflammable gases occluded in the coal, and so greatly to accentuate the danger of spontaneous ignition.

*Size of the Coal.*—That fine coal is a more active absorbent of oxygen, and more liable to ignite spontaneously, than large coal, was shown as far back as 1868 by Richter. Practically all the later experiments in this field concede this to be true; for, having a greater surface, the fine particles can absorb much more oxygen than large lumps, and since this rapidity of absorption causes an increase in temperature, which in turn produces favourable conditions for further absorption and for chemical action between the oxygen of the air and the hydrogen of the coal, the danger of spontaneous combustion is greatly increased.

*Gases Occluded in the Coal.*—While it is now a well-known fact that gases of an inflammable nature are occluded in coal, their relation to its spontaneous ignition has not yet been clearly established. Whether the occluded gases are the real cause of spontaneous ignition is doubtful; but if the coal becomes heated-up, by oxidation or some other cause, to a temperature high enough for the oxygen of the air to unite with these gases, it is seen that the presence of these gases constitutes a source of danger, and then coals with large quantities of gases occluded in them would be more liable to ignite than those containing smaller amounts of these gases.

*Presence of Moisture.*—Opinions differ greatly as to what part moisture in the coal plays in its spontaneous combustion. Some, as Doane, believe the moisture content of the air-dry coal to be a direct index of its power to ignite spontaneously. Evidence given to the New South Wales Commission and also to the British Commission shows that coal piles are more apt to take fire during warm weather following showers than at any other time, though Fayol, as a result of experimental work, claims that the influence of the weather on coal heaps has not been sufficiently marked to be observable. Erdmann and Stolzenberg believe the spontaneous combustion of coal to be due to the formation of ozone by the action of the sun on warm, sunny days following rain, when the surface evaporation is especially great. If this is true, moisture plays a more important part in the phenomena of spontaneous combustion than has heretofore been ascribed to it.

That the presence of moisture materially assists the pyritic oxidation is generally conceded, though whether it causes an increase in temperature or merely a disintegration of the coal due to the formation of ferrous sulphate is a matter of dispute. Some believe that the only part moisture plays is a mechanical one, where alternate freezing and thawing break up the coal into smaller particles, and so expose more surface to the oxygen of the air. Again, it is thought that, apart from increasing the pyritic oxidation, moisture acts as a catalytic agent between the carbon and hydrogen or unsaturated bodies of the coal and the oxygen of the air. Perhaps, as Erdmann and Stolzenberg have suggested, this reaction may consist in the formation of ozone, which is immediately absorbed by the coal. This idea of catalytic action on the part of the moisture is substantiated to some extent by the fact that some coals containing minimum amounts of pyrites are nevertheless very liable to spontaneous ignition.

*Accessibility of Oxygen.*—That the combination of oxygen with the constituents of the coal causes a rise in temperature seems to be firmly established. Which particular constituent is the cause of the rise has not, however, been shown with any great degree of certainty. The presence of humic acid in the oxidized coal leads one to believe that the oxygen combines with some of the unsaturated humus bodies—such as the polysaccharides. That this humus substance is an unsaturated body is shown by the fact that it absorbs large amounts of bromine without the evolution of hydrobromic acid.

The idea is also held that the oxygen of the air combines directly with the carbon and hydrogen of the coal, and so causes an increase in temperature. If amorphous carbon (charcoal and lampblack) can be oxidized to carbon dioxide on exposure to the air by means of bacteria, as has been proved by Potter, the oxidation of the carbon of the coal is very probable. The presence of oxygen is therefore to be avoided, and the old idea of thoroughly ventilating the coal piles by free access of air is now gradually being dropped, and, at present, authorities deem it advisable to keep the coal away from air as much as possible, either by submerging it under water or by storing it in covered concrete bins. If ventilation is used to lower the temperature of the coal, it should be through pipes, so that the cooling air cannot come in contact with the coal.

*Pressure on the Coal.*—The belief that pressure on the coal is

one of the leading factors in its spontaneous ignition seems to be gaining ground, and because of this fact it is advocated that coal heaps should not be any higher than 15 to 20 feet. In a store of this size the question is very probably one of pressure rather than radiation, though in smaller storage units it would probably be hard to decide whether the cause of the spontaneous combustion was due to pressure or to lack of proper insulation of the heat generated within the pile.

With these propositions established, the real importance of these initial activities is at once apparent and the fundamental principles which must be observed in remedial processes are made evident.

## THE DESIGN OF GAS-CONDENSERS.

At the last Meeting of the Canadian Gas Association, a paper entitled "Notes on the Design of Gas-Condensers" was submitted by Mr. J. S. HARRG, the Assistant-Engineer of the Montreal Light, Heat, and Power Company. In the course of it, he made the following remarks.

In the design of condensers, the most important determination to make is the necessary amount of water-cooling surface. The air-cooling surface, while assisting to some extent, is so much less in quantity and efficiency that it need not be considered in the design. Cooling surface depends upon two things—first, the amount of heat to be transferred from the gas to the water; and, second, the rate at which a given surface will transmit heat. The first depends upon the difference between the temperature of the gas at the inlet of the condenser and that which it is desired to maintain at the outlet, and on the condition of saturation of the gas and the liquid products to be condensed. Crude gas which has passed through a hydraulic main or wash-box may be assumed to be saturated as it comes to the condenser; and by far the greatest amount of heat which the gas contains at this point is the latent heat of vaporization of the steam in the gas, and the heat to be extracted from condensed water at the gas-inlet temperature to bring it to the gas-outlet temperature. There is also the heat of vaporization of the hydrocarbons condensed, and heat abstracted from the gases themselves. For practical purposes, they need not be considered, especially as the air-cooling surface is not taken into account; and this tends to compensate for any small error involved in neglecting minor quantities of heat.

To obtain the number of heat units to be extracted, the weight of water vapour in the gas at the inlet temperature must be ascertained, and that at the outlet temperature deducted. The difference will be the weight of water condensed; and this multiplied by the heat units lost per pound between the working temperatures will give the total amount of heat to be extracted. The inlet temperature should be determined as closely as possible, as a few degrees of temperature difference will affect the results considerably. Variation in the outlet temperature does not affect the result so much.

The next point to consider is the quantity of cooling surface necessary to transmit this heat; and this varies considerably with the temperatures involved and the condition of the cooling surface, whether clean or dirty. The heat transmitted per unit area—say, per square foot of cooling surface—depends first on the difference in temperature on the two sides of the surface, which may be conveniently described as heat potential or heat differential. From tests made by the writer, a figure of approximately 6 B.Th.U. per square foot was established for 30° heat potential and steel surface not absolutely clean, but in average working condition with some mud coating. To describe this unit further, it means that when the average difference between the temperatures of gas and water in a condenser is in the neighbourhood of 30° Fahr., each square foot will transmit 6 B.Th.U. per hour for every degree of temperature difference. Consequently, if this difference is 25°, a square foot will transmit 150 B.Th.U. per hour; if the difference is 35°, it will transmit 210 B.Th.U. It must be borne in mind, however, that as the temperature differences decrease, the unit given will slowly decrease, and *vice versâ*. In other words, at high heat potential differences, the heat transference per degree is greater than at low heat potential differences; so judgment must be exercised, and the constants should be used without modification only within limits. Some amount of latitude is, however, permissible, due to errors unavoidably introduced by muddy water and variations in water temperature.

The number of tubes required depends on the diameter and length adopted. A 3-inch tube is a good working size. If much smaller, it gives trouble more frequently with stoppage, and is not so easy to clean out. If a much larger tube is used, the heating surface per square foot of floor space is diminished without any compensating gain. A 20-feet length of tube works out well for a condenser with vertical tubes, as it is structurally strong, is long enough to give good proportions, and does not require excessive head room. It is also not too long to be easily obtainable commercially. For small condensers a shorter tube could be used.

The dimensions of a condenser, the cooling surface and size of tubes having been determined, are fixed by the spacing of the tubes; and this is something not subject to mathematical calculation, but is more or less a question of experience and judgment. One would ordinarily space the tubes as closely together as possible, to obtain the largest amount of cooling surface in a small condenser, but is limited in this by working conditions. A coal-gas condenser especially is subject to stoppage by naphthalene mixed with tar; and it is important to design the condenser so that the spaces between the tubes are large enough to be accessible for cleaning, and also to make stoppages less frequent. The more room there is round the tubes, the more sludge is required to fill up the space; and, what is more important, the semi-liquid mass flows away to the seal-pot more readily. For coal-gas condensers, a good working arrangement is when the tubes are spaced at such distances that they occupy about 18 per cent. of the total area of the tube sheet. For water gas, which is less liable to obstruction, from 23 to 25 per cent. has given good results.

The condenser may be either cylindrical or rectangular. For condensers smaller than 10 feet diameter, the cylindrical shape is usually adopted; but a condenser larger than this can be made rectangular with advantages of floor space. Connections should always be made so that the water runs in the opposite direction to the flow of gas; thus preserving the maximum heat potential, and ensuring the greatest heat exchange. For this reason two cylindrical condensers are often set in tandem—the gas going first through No. 1 and then through No. 2, while the water enters No. 2 close to the gas-outlet, and leaves No. 1 close to the inlet. The principle can be extended in condensing coal gas, with great advantage, by making the overflow from the secondary condensers feed the primary condensers. By this means considerable economy in the consumption of water is effected, and at the same time a more uniform heat potential is maintained. With the primaries fed with warm water, the gas is not "shocked" so much as if both primaries and secondaries get cold water.

In the gas space of the condenser baffle-plates should be placed, causing the gas to travel backwards and forwards across the tubes. By this means three advantages are obtained—first, the cooling surface is made more efficient, by increasing the velocity of impingement; second, short-circuiting or travelling from the inlet to the outlet, missing considerable surface, is prevented; and, third, a scrubbing action is obtained, which helps to remove condensation at the temperature at which it condenses, which is a recognized principle in condensing. The amount of baffling is limited by the somewhat increasing liability to stoppage. But four or five passes in the length of the tube can be employed with advantage; and in large condensers there should be vertical divisions as well as horizontal baffles. These should be so arranged that the gas travels successively from the warmer to the cooler portions of the condenser, ensuring efficient heat exchange; and the flow of the water should be directed to pass gradually from the coolest to the warmest portion.

Provision should be made for cleaning the condenser, especially above the lower tube sheet, by having a sufficient number of hand holes. Manholes in the lower water space and gas space are also necessary. The inlet and outlet connections for the gas are usually cast-iron flanged pipes, and will be ample in size if the linear velocity of the gas passing through them does not exceed 800 feet per minute. The size of water-inlet depends on the pressure in the supply main, and should be of such a size that the valve will be about 30 per cent. open when passing the maximum probable amount of water that the condenser will use. The water overflow connections and the connections from one condenser to another, when condensers are operated in tandem, should be designed so that the velocity of water in the pipe does not exceed 200 feet per minute. The water compartment should be provided with a drain-valve at the base of the condenser, so that it can be emptied when necessary. Tar-overflows should be made of ample size to take condensation quickly away from the tube sheet, as this is the point at which stoppage in condensers begins.

In designing condensers, as with other pieces of apparatus, it must be remembered that the conditions under which they work are variable, particularly the temperature of the condensing water, which may vary from 84° Fahr. in the summer to 34° Fahr. in the winter. Consequently, the condensers must be of sufficient size to perform their maximum duty under the most unfavourable circumstances. This condition will usually occur when the temperature of the condensing water is highest, in the latter part of the summer. It is then necessary, especially in the case of coal-gas secondary condensers, to cool the gas almost to the temperature of the inlet water. Consequently, as the temperature differential is so small, the amount of heat transmitted per square foot of surface will be correspondingly low; and sufficient surface must be provided to transmit all the heat. When these conditions are properly met, the capacity will be ample under all circumstances.

---

Mr. W. M. Mason, the Secretary of the British Commercial Gas Association, is giving a lecture to-night (Tuesday) at Sutton, on "Coal Gas: A Century of Service," illustrated by lantern slides, specimens, and experiments.

Among a large number of bequests by Mr. John Taylor, of Mickleton, Gloucestershire, market gardener and grazier, who left estate of the gross value of £6646, of which £4060 is net personalty, was one of £50 to the Mickleton Parish Council, for the erection of street-lamps in the village.

The opening meeting of the session of the Scottish Junior Gas Association (Western District) will be held in the Royal Technical College, George Street, Glasgow, next Saturday evening. Mr. Malcolm Littlejohn, of the Lighting Department, Glasgow will read a paper on the "Methods of Calorimetry."

# GASEOUS EXPLOSIONS.

## Seventh Report of the British Association Committee.

In the "JOURNAL" for the 1st of September (p. 515), an epitome was given of the seventh report of the British Association Committee on Gaseous Explosions, which was presented in the Engineering Section at the recent meeting in Australia. We have since received the full text of the report, and are, therefore, in a position to deal with it at greater length.

### INTRODUCTION.

In their introductory remarks, the Committee refer to the loss they had sustained by the death of their Chairman, Sir William Preece, who had associated himself intimately with the investigations carried on by them, and had contributed an interesting note on the kinetic theory of gases. As Chairman, he did much, by his valuable suggestions and his tactfulness and resource, to help forward the important work on which the Committee are engaged. The Vice-Chairman (Mr. Dugald Clerk, D.Sc.) was unanimously elected to fill the vacant chairmanship.

The Committee held three meetings during the session of 1913-14, and the following notes were presented and discussed: No. 32, by Professor Dalby, on "Suction Temperatures," directly measured and deductions therefrom, together with a summary of a series of seventeen experiments made at the College on a Crossley gas-engine with a 7-inch diameter cylinder, 14-inch stroke, and with a compression ratio of 4·8. No. 33, by Mr. H. E. Wimperis, on "Thermal Efficiency." No. 34, by Professor E. G. Coker and Mr. W. A. Scoble, on "Temperature Distribution in the Cylinder of a Gas-Engine." No. 35, by Professor W. Watson, on "The Spectroscopic Study of Combustion of Air-Petrol Mixtures."

The object of No. 32 was to show how the suction temperature varied with the speed, with the jacket temperature, and with the mixture. The records given in the note relate to trials Nos. 72 to 90. The data were obtained by a research student of the College (Mr. Limborne), when working under the supervision of Professor Dalby. A table included in the note shows the variation in the suction temperatures, and a set of curves, also included, gives the temperatures of the working mixture. These indicate how the direct knowledge of the suction temperature can be applied to determine the temperatures at other parts of the cycle.

In No. 33, Mr. Wimperis discusses the thermal efficiency of an engine employing as the working agent a standard gas referred to in the first report of the Committee, and using in his calculations the values of the internal energy defined by the curve in one of the figures of that report.

In No. 34, Professor Coker describes the method of measuring the cyclical temperature in a gas-engine cylinder used by him at the Technical College, Finsbury, and gives the results of some recent experiments. Curves are included showing the temperature of the explosive charge, together with tables of the actual temperatures at various points in the cycle. A full description of the thermocouple used in these experiments is given.

In connection with No. 35, Professor Watson showed a series of photographs of the spectrum of the light given by the burning charge in the cylinder of a petrol-engine. The results show that the gases in the cylinder continue to emit light, giving a line spectrum for a considerable time after the chemical changes are generally assumed to have been completed.

### PREVIOUS WORK OF THE COMMITTEE.

Before proceeding to consider the work carried out during the past session, the Committee deemed it advisable to give a brief summary of their six previous reports. This it may be of interest to reproduce, as showing the progress and the nature of their investigations.

The first report [1908] is devoted mainly to the specific heats of gases at high temperatures. The experiments of Wiedemann, Regnault, Holborn, and Henning are analyzed and discussed, and a curve is given showing the energy of carbon dioxide steam, and air in terms of the temperature centigrade. The experiments of Mr. Dugald Clerk are described, and the results obtained compared with the constant-pressure experiments mentioned above. The closed-vessel experiments of Mallard, Le Chatelier, and Langen are analyzed, and the results plotted and discussed. The report ends with the discussion of thermal equilibrium, chemical equilibrium, the motion of a gas, and the measurement of temperature. A curve is given showing the internal energy of a gas-engine mixture in terms of the temperature. There is an appendix by Professor Callendar, on "The Deviation of Actual Gases from the Ideal State," and on "Experimental Errors in the Determination of their Specific Heats."

The second report [1909] is mainly devoted to the specific heat of gases at high temperatures. Regnault's results at low temperatures are discussed in the light of Mr. Swann's experiments, which were communicated to the Committee by Professor Callendar. The Committee definitely adopted Mr. Swann's values for air and for carbon dioxide, as follows: Volumetric heat of air at 100° C., 19·8 lbs. per cubic foot; volumetric heat of $CO_2$ at 20° C., 27·4 lbs. per cubic foot, and at 100° C., 30·7 lbs.

The results of the experiments by Mr. Dugald Clerk, with the object of determining the volumetric heat of air at high temperature, are given in the report, together with a description of Professor Hopkinson's experiments on the compression of air in a gas-engine cylinder. Dr. Watson's researches on the efficiency of a petrol motor are included in the report. Dr. Watson made a simultaneous measurement of the quantities of air and petrol taken into the engine, and of the chemical composition of the exhaust gas. The point brought out was that the ratio of hydrogen to carbon in the exhaust gas was greater than the ratio of hydrogen to carbon in the petrol used. Additional evidence of this discrepancy is furnished by some experiments of Professor Hopkinson; and the experiments of Hopkinson and Watson are in agreement. The report concludes with an account of the experiments on radiation carried out by Professor Hopkinson. There are two appendices—one relating to Regnault's corrections in connection with the determination of the specific heat of air; the other relating to Deville's experiments on the dissociation of gases, by Dr. Harker.

The third report [1910] is devoted mainly to radiation from gases. A brief history of the subject is given, together with a record of the experiments of Professors Hopkinson and Callendar. The report discusses the direct effect of radiation on the efficiency of internal-combustion motors, the amount of radiation from flames, and the molecular theory of radiation from gases, as well as the question of the transparency of flames to their own radiation. There is an appendix on the radiation of flames, by Professor Callendar, giving some account of experiments made with a Mèker burner; a second appendix on the radiation in a gaseous explosion, by Professor Hopkinson; and a third which contains abstracts from various papers relating to the application of heat radiation from luminous flames to Siemens regenerating furnaces.

The fourth report [1911] merely notes the number of meetings held during the year, and states that, partly owing to the breakdown of apparatus and partly to the demands made upon the time of the various investigators, only two notes were read. Consequently, it was decided that the work then on hand should be included in the report for the following year.

The fifth report [1912] continues the discussion of the effect of radiation, and is devoted mainly to the consideration of the factors which determine the heat flow from the gas to the walls of the cylinder. The remarkable effect of turbulence on the rate of combustion is first mentioned in this report. Particulars of Mr. Dugald Clerk's experiments are given, and they definitely establish the fact that, but for turbulence, the speed at which modern internal-combustion engines are run would be impossible. Professor Hopkinson's experiments, in which a fan was placed inside a closed vessel and the rates of combustion observed with the fan at rest and in motion, are recorded in the report, and confirm Mr. Clerk's results.

In the sixth report [1913] it was stated that Professor Dalby and Mr. Clerk were engaged on the design of some experimental plant to be placed in the new laboratory of the City and Guilds Engineering College. Six notes, relating chiefly to heat flow, temperature, and leakage, are briefly summarized.

### OBJECT OF THE PRESENT REPORT.

The seventh report is devoted partly to the special consideration of temperature measurements and subjects arising therefrom, and partly to the illustration of the use which can be made of the data obtained by the Committee. One of the problems requiring solution was the direct measurement of the temperature of the working agent in the cylinder while the engine was running under ordinary conditions. The difficulty of making this measurement arises from the fact that during the explosion of the charge in the gas-engine cylinder the temperature is sometimes higher than that of the melting-point of platinum, or of the couples which can be put in the cylinder to make the measurement. In Note 32 is described a method devised by Professors Callendar and Dalby, which, for the first time, enabled direct observation of the suction temperature to be made while the engine was working, not only under normal but under special conditions, during which the richest possible mixture was used, and the temperature reached at explosion was considerably higher than that occurring in practice. The thermometer itself consists of a piece of platinum wire about 0·7 inch long and 1-1000th inch diameter, arranged with compensating leads. It is placed in a thermometer-valve which is inserted through the spindle of the admission-valve to the engine. The cam is so designed that during the explosion period the valve is closed, and the thermometer is therefore screened from the action of the gas. In this way the thermometer is withdrawn just before the end of compression, so that at this critical period of the cycle there is nothing in the shape of a protuberance to cause pre-ignition. When the thermometer is exposed in the cylinder and connected to the Wheatstone bridge and galvanometer on which the indications are received, the circuit is made by a contact-maker on the crank-shaft when the crank passes through an assigned crank angle, and is broken when the crank passes through a second assigned angle a little greater than the first. Thus the electrical measuring device is in operation during 5°, 10°, or 15°, as the case may be. The contact-maker enables a definite make and break to be made in the electrical circuit, and, in addition, allows the intermediate time to be adjusted with accuracy.

The temperature is measured during a particular crank angle determined by the setting of the contact maker. Having found the temperature at one point in the cycle, the temperature at any other point can be calculated by using the charge itself as the thermometric agent. The characteristic equation of the charge is $\frac{PV}{T}$ = a constant. If, therefore, from the indicator diagram taken

at the time the temperature was measured, the corresponding pressure and volume are measured, the temperature at any other point of the cycle can be calculated by the aid of this constant, and the pressure and volume scaled from the indicator diagram, allowance being made for the chemical contraction of the charge after explosion. It is necessary to have accurate indicator diagrams from which to measure the pressure and volume for this purpose; and this has led to the development of an optical indicator.

The Committee give an example of the application of the method described to an engine trial (No. 72) at the City and Guilds Engineering College. A pair of typical diagrams, taken during the trial, together with the scales, are shown. The following data relate to the trial: Mixture, 6·88 of air to 1 of gas by volume; jacket temperature, 29·5°; temperature measured at crank angle 200°, 77° C.; pressure measured from the diagram at 200° crank angle, 14·7 per square inch; volume measured at this point, 0·3872 cubic foot; speed, 106 revolutions per minute. The gas constant for the charge is therefore $\frac{PV}{T} = 0{\cdot}01616$. This constant may now be used to calculate the temperature at any point along the compression curve, since at the point where the pressure is P and the volume V the temperature is

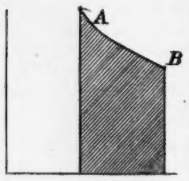
$$T = \frac{PV}{0{\cdot}01616}$$

The constant cannot, however, be applied during the whole cycle, because, though the weight of the charge remains the same, assuming that there is no leak, the volume corresponding to this weight is slightly different after the explosion has taken place, owing to the contraction due to the chemical rearrangement of the constituents. The chemical contraction is calculated from the analyses of the gases. In the gas used in the experiments referred to, the contraction amounted to 3·14 per cent. The effect of this is to change the gas constant for all points along the expansion curve from 0·01616 to 0·01565.

The Committee next describe the method of measuring the temperature of the charge by means of a thermocouple; and, after a brief reference to some direct measurements of the suction temperature made at the City and Guilds College during the session 1912-13 to show how this varied with the speed, the jacket temperature, and the mixture, they pass on to consider the cyclical variation of the temperature of the charge in a gas-engine cylinder, and then deal as follows with the

Application of the Investigation to Practical Problems.

The application of the work of the Committee to practical problems can be illustrated in connection with the calculation of the heat exchanged between the working agent and the walls of a gas-engine cylinder.




Let A in the accompanying diagram be a point on the diagram representing the state of a working agent with regard to its pressure and volume; and let the state change along the path A B, so that B represents the state after the change. Then—

$$\left\{\begin{array}{c}\text{The heat received by the working agent from its external environment during the change of state from A to B} = Q\end{array}\right\} = \left\{\begin{array}{c}\text{Mass of charge}\end{array}\right\} \times \left\{\begin{array}{c}\text{The change of its internal energy per pound}\end{array}\right\} + \left\{\begin{array}{c}\text{The work done by the agent on its environment}\end{array}\right\} \quad (1)$$

That is reckoning in thermal units,

$$Q = M\,(E_B - E_A) + \frac{Z}{J} \qquad (2)$$

In which Q is measured in pound-calories.

M is the mass of the charge in pounds.
$E_B$ is the internal energy of the charge in its final state.
$E_A$ is the internal energy of the charge in its initial state.
$Z$ is the work done by the agent on its environment, measured in foot-pounds.
$J = 1400$.

Earlier it was assumed that the specific heat of the gas used in the gas-engine cylinder was constant, and that the change of internal energy was determined by the change of temperature only. With this assumption the first term on the right-hand side of the equation was reckoned by merely multiplying the specific heat into the change of temperature corresponding to the change of state from A to B; the mass of the charge M being calculated from the general relation—

$$M = \frac{PV}{cT} \qquad (3)$$

corresponding values of P, V, and T being taken from any point on the path where they could be determined. It is known, however, that the specific heat is variable; and the Committee began their work by reviewing all the available experimental data in connection with the subject. Several members of the Committee were themselves carrying out researches in relation to this problem at the same time.

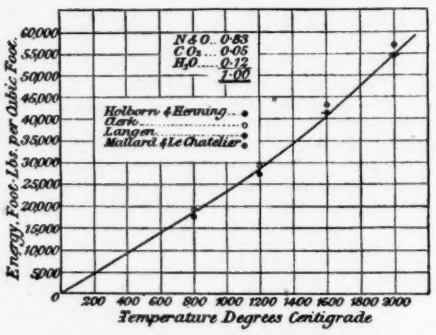
The aim of the Committee was to ascertain the true value of the specific heat at constant volume $K_V$, or, to put it another way, to ascertain the relation between the internal energy of the gas and its temperature. In dealing with gas-engine problems, it is more convenient to combine equations (1) and (2) into a single expression, in which the specific heat is given not in terms of the unit of mass, but in terms of the unit of volume at standard pressure and temperature. Substituting in equation (3) for the standard pressure 1 atmosphere, for the standard temperature 273° C. absolute, and for the gas constant $c = 96$, it will be found that the weight of a cubic foot of the working agent at standard temperature and pressure is 0·081 lb., and therefore in terms of foot-pounds, and still assuming that the specific heat at constant volume is constant, equation (2) becomes—

$$J\,Q = 0{\cdot}081\,J\,K_V\,(\text{change of temperature}) + Z.$$

The quantity $0{\cdot}081\,J\,K_V$ represents the change of internal energy in foot-pounds per degree change of temperature per cubic foot as measured at standard temperature and pressure. When $K_V$ is variable and is a known function of T—say $\phi$ (T)—the term becomes

$$0{\cdot}081\,J \int_{T_1}^{T_2} \phi\,(T)\,d\,T.$$

Values of this expression, in which the lower limit $T_1$ is 0° C., can be read off the curve given in the accompanying diagram, which is taken from the Committee's first report.




**Internal Energy of Gas-Engine Mixture.**

To use this curve to find the internal energy corresponding to a given state-point, it is necessary to measure the pressure P and volume V from a P V diagram, and also to determine the absolute temperature T. The corresponding volume at standard temperature and pressure is then calculated from the equation—

$$V_0 = \frac{V\,P\,T_0}{T\,P_0}$$

This calculated value of $V_0$ when multiplied by the internal energy, as given by the curve for the temperature T, gives the internal energy of the gas corresponding to the given state-point.

Symbolically, let

$E_A$ = internal energy corresponding to the position of a state-point A.
$V_{A0}$ = the corresponding volume measured at A reduced to standard temperature and pressure, and
$Y_t$ = the ordinate of the curve measured at the temperature corresponding to the temperature of the state-point, then

$$E_{A0} = V \quad Y_t$$

The position of the points A and B on the P V diagram gives no indication of the temperature at A or B. If the temperature at one of the points, however, is known, then the temperature at the second point can be calculated from the relation

$$\frac{P_A\,V_A}{T_A} = \frac{P_B\,V_B}{T_B} \qquad (4)$$

This relation expresses the characteristic equation for gases, and is quite independent of the specific heat of the gases concerned. It applies to all positions of the state-point in the P V diagram, provided that the following two conditions are satisfied: (1) That there is no change in density of the gas, such as may be produced by some change in its chemical constitution; (2) that the weight of the working agent during the change of state from A to B is constant.

It is fundamentally important, therefore, to be able to measure by direct observation the temperature corresponding to at least one position of the state-point in the diagram, because by means of this temperature and the relation expressed in equation (4) the temperature corresponding to any other position of the state-point in the diagram can be calculated, providing always that conditions 1 and 2 are not violated during the change of state. If the first condition is violated, there is a small change of volume caused by chemical action as the state-point moves from A to B; and in order to calculate the magnitude of this change, it is necessary to have a chemical analysis of the gas before and after chemical action. When these analyses are known, a correction can be made, and equation (4) can still be applied to calculate the temperature. This kind of action has to be reckoned with—for example, if the state-point A is on the compression curve of a gas-engine and the state-point B is on the expansion curve.

The earlier part of the report shows that the Committee have

given a good deal of consideration to the subject of the direct measurement of temperature, and that individual members have successfully worked at the problem. Examples have been given of methods which have been applied and are being used in the researches which are now being carried out. This example shows how the equation (4) is used to calculate the temperature for different positions of the state-point B from observations of a single temperature. The single temperature which it is most useful to know is the suction temperature, and this may be defined as the temperature of the charge in the cylinder just after the admission-valve is closed. There is then a definite weight of charge in the cylinder at a definite pressure and volume, and at a definite temperature. Allowing for chemical contraction, equation (4) can be applied along the expansion curve.

To resume, it can now be assumed that it is possible to fix a temperature for one particular position of the state-point A, and then the temperature at the end of the change to state B, if not observed, can be calculated. With a knowledge of these temperatures, the internal energy of the working agent can be read off from the curve in the above diagram; and then the first term on the right side of the equation—viz.:

$$E_B - E^A = \text{change of internal energy}$$

is determined. The value of the second term on the right side of equation (1) is merely the value of the shaded area under the path A B expressed in foot-pounds. Consequently, from a pressure-volume diagram giving the initial and final conditions of the working agent and the path of the state-point in between, together with the temperature corresponding to one position of the state-point, the right side of the equation can be determined, and the heat gained or lost by the working agent during the change can therefore be computed. If there is no gain or loss of heat, the work done is done at the expense of the internal energy of the working agent itself.

One of the main objects of the Committee has been to extend our knowledge of the physical constants of the gases by the careful examination of methods, apparatus, and results of various investigators, including members of the Committee, and change of state of the working charge in a gas-engine can now be followed with a degree of accuracy which hitherto has been impossible.

The concentration of research on the accurate measurement of temperature is a necessary step towards a more certain knowledge of the specific heat of gases at high temperatures; and the vital importance of this subject is indicated by the brief explanation given of the method by which the determination of heat exchange between the working charge and the walls of the cylinder can be made. So far the Committee have only been able to present the curves in the diagram as representing the most reliable data available. The practical use to which the curve can be put is illustrated by using the data given by it to find the efficiency of an engine working on the Otto cycle without loss of heat, assuming that the mixture used is that specified near the curve; this mixture being very much nearer the actual mixture used in a gas-engine than air.

The Committee are of opinion that they can usefully continue their work by organizing research on the lines which have been foreshadowed in this report. They recommended reappointment.

## Recovery of Ammonium Chloride in Gas-Works.

The "Chemische Zeitschrift" recently contained a paper in which the author explained the reason for ammonium chloride presenting certain advantages over sulphate as a bye-product; and he described the general method of manufacture. According to an abstract in the "Journal of Industrial and Engineering Chemistry," among the reasons for manufacturing the chloride rather than the sulphate are these: The fact that there is a market for the pure chloride; the fact that in the condensates from gas manufacture ammonia is already present to by far the greatest extent as the chloride; and the possibility of an over-supply of ammonium fertilizer salts coming on the markets in the future through the further development of synthetic nitrogen fertilizer processes. In the manufacture of the pure product two chief results must be attained—the ammonia present otherwise than as the chloride must be transformed, and impurities, chiefly organic, must be removed. For example, the liquor, containing perhaps 200 grammes of salt per litre, is acidified with hydrochloric acid and oxidized with an air current. Sulphur is filtered off and iron precipitated with ammonia. Ammonium sulphate is decomposed by sodium chloride, after filtration and neutralization of excess ammonia, and the solution is evaporated to dryness. The residue is now sublimed; the ammonium chloride being thus separated from sodium sulphate and chloride, a small amount of phosphates, and most of the organic impurities.

**Causes of Failures of Concrete.**—In a paper on this subject, read by Mr. R. S. Greenman at the annual meeting of the American Society for Testing Materials, it is stated that concrete is said to be its own best inspector; and it is a well-known fact that defects will sooner or later make their presence known. The reasons for poor concrete have been proportioned as being 90 per cent. due to poor workmanship, 8 per cent. to poor aggregates, and 2 per cent. due to poor cement. These reasons, and the additional one of the influence of the water used, are responsible for most of the failures in concrete. These are more frequent in smaller than in larger work, with losses proportionately greater.

## GAS IN THE ROYAL MINT.

### Melting Nickel-Bronze Bars.

Among the appendices to the annual report of the Deputy Master and Comptroller of the Royal Mint for the year 1913, is a memorandum by Mr. Edward Rigg (the Superintendent of the Operative Department), which contains useful data regarding the melting of nickel-bronze bars by gas, practically 124 tons of which were required. On this subject, Mr. Rigg says:

It is desirable that I should here record the fact that this is the first occasion on which nickel-bronze bars have been called for since coal gas was adopted as the sole fuel on Jan. 24, 1911. We are thus in a position to compare the work as a whole under the new system with that prior to the rebuilding of the melting-houses, when coke alone was used. For this purpose I will place side by side details of the work done in 1913 with corresponding particulars for 1909, the last year entirely under the old *régime*. Although, as will be seen, the gross out-turn was 1957·9 tons in 1913 and only 1197·7 tons in 1909, the records are comparable owing to the fact that the proportion of bronze and nickel-bronze (which require higher temperatures for melting than gold and silver) to the total was approximately identical—namely, 56·3 per cent. in the earlier and 55 per cent. in the later year. Taking the several items of cost, grouped under the three headings fuel, crucibles, and wages, the results are as shown below.

| Year. | Weight of Good Bars Cast. | Annual Charge. | | | | Rate per Ton in Shillings. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Fuel. | Crucibles. | Wages. | Total. | Fuel. | Crucibles. | Wages. | Total. |
| | Tons. | £ | £ | £ | £ | s. | s. | s. | s. |
| 1909 . | 1197·7 | 1455·0 | 2521·1 | 938·8 | 4914·9 | 24·29 | 42·09 | 15·68 | 82·06 |
| 1913 . | 1957·9 | 2162·3 | 2613·4 | 1060·8 | 5836·5 | 22·09 | 26·69 | 10·84 | 59·62 |

The gross saving per ton of good bars is seen to be no less than 22·44s., or 27·3 per cent. of the total charge in 1909. Side by side with this economy there has been a very marked increase in efficiency, both in regard to the output per furnace and per man, as well as many minor economies, such as the disposal of ashes, handling of fuel, and a great reduction in the weight of "sweep" to be dealt with. The output per furnace per day has risen as follows, the increases for the several metals dealt with being separately recorded:—

| Metal. | Average Melt per Furnace per Day. | | Increase per Furnace. | |
|---|---|---|---|---|
| | 1909. | 1913. | Cwt. | Per Cent. |
| | Cwt. | Cwt. | | |
| Gold . . . . . | 5·2 | 9·8 | 4·6 | 88·5 |
| Silver (shilling bars) . . . | 5·7 | 12·8 | 7·1 | 124·5 |
| Bronze . . . . . | 5·2 | 13·4 | 8·2 | 157·7 |
| Nickel-bronze . . . . . | 3·6 | 9·4 | 5·8 | 161·1 |

The increased efficiency per man employed in the melting branch on the gross output is represented by a rise from 59·6 to 73·3 tons per annum, or 23 per cent.

In the Perth (W.A.) Branch of the Royal Mint, also, there are a group of thirteen gas melting-furnaces. A Roots blower direct-coupled to a 20-H.P. motor provides the air pressure of 1¾ lbs. required for the burners.

## GAS-FIRED STEAM-BOILERS.

This was the subject of a paper prepared for the meeting of the Canadian Gas Association by Mr. H. E. G. Watson, the Superintendent of the Industrial Department of the Consumers' Gas Company of Toronto. The following are some extracts from it.

It is generally acknowledged that the chief factor in the tremendous industrial development of the last century was the introduction of the steam-engine as a source of power. To the small manufacturer, however, the power problem is still a matter of vexation, worry, and excessive expense. Naturally, therefore, with the perfection of electric motors and small gas-engines, hundreds of manufacturers have rid themselves of the troublesome steam installation. Many more would gladly do so were it not for the fact that small quantities of steam are required for various manufacturing operations. Here is an opportunity for gas companies, and the industry has taken advantage of it to a certain extent; but only a fraction of the possible business has been secured in some cities. It is certainly desirable; being an off-peak load, seldom requiring an additional service to be laid, and averaging a steady monthly consumption of about 10,000 cubic feet per horse power of boiler. After a satisfactory installation has been made, little trouble is to be expected. Our Company have been installing boilers for several years, and we have yet to receive a complaint about the amount of the gas bill. Progressive

manufacturers supply well-built economical boilers; and though their rather high cost has retarded their introduction, they are now rapidly approaching the prices of coal-fired boilers of equal capacities. There would seem, then, little reason why any gas company should hesitate in placing as many as possible. A little judicious advertising, and a canvass by intelligent salesmen, will start the ball rolling. After that, proper installations and careful following-up of prospective customers will do the rest.

In figuring on an installation, the safety of the boiler should receive first consideration; then simplicity; and, finally, the striking of a nice balance between economy of operation and first cost. This last must be carefully considered, bearing in mind the purpose for which the boiler is wanted. For example, a man needing a boiler for sterilizing milk-cans, which is used perhaps less than an hour a day, would want the lowest-priced boiler he could buy to do his work. A hat manufacturer using steam eight or ten hours a day could afford to spend a considerable amount to secure economy in fuel and labour. If the salesman is to secure the business permanently, he must decide these points, taking care of the best interests of the customer. Probably the most difficult thing is to select a boiler of the proper size. One too large may spoil the sale by making the price prohibitive; if one too small is selected, everybody concerned will wish the sale had never been made.

Gas-fired boilers, like coal-fired ones, are commonly rated in horse power. Occasionally it is to be feared they are over-rated. One horse-power is the evaporation of 34·5 lbs. of water from and at 212° Fahr.—in round figures, equivalent to 33,000 B.Th.U. This gives a very indefinite idea in making comparisons of boilers, as no certain percentage of efficiency is standard. Recently the Boiler Manufacturers' Association decided that there should be 10 square feet of heating surface to 1 H.P. in a horizontal tubular boiler. The problem, then, for the salesman is, How many heat units are needed to do the work? This number divided by 33,000 will give the horse power required. Allowance must, of course, be made for heat losses from steam-pipes, &c., and also for any additional work which the boiler may have to do. It is difficult to give any rule for determining the number of heat units required, as each problem has to be figured out by itself, and the results considered in the light of past experience. Where coils or radiators are to be heated in places at ordinary living temperatures, from 80 to 120 square feet can be taken as equal to 1 H.P. Where the coils are in dry kilns, this will take care of a considerably larger surface. If the coils are in liquids, or steam is used in jacketed kettles, it is better to disregard heating surface, and from the specific heat of the substance to be heated figure the heat units necessary to bring it to the required temperature. In such a case the outside surface of the container must be counted in as radiating surface.

In all these calculations, the time element must be considered. The customer must decide the longest time he can take for the work; the longer he can give, the smaller the boiler required. Where air is to be blown over coils, much more heat will be removed from them than under ordinary conditions. In this case disregard the coils, and figure the quantity of air to be heated and the temperature to which it must be raised. For heating matrix tables, shoe-machines, vulcanizers, &c., the weight and specific heat of the substances must be found, the heat units calculated, the machine itself being counted in as a radiator. In all cases a reasonable peak load must be allowed for starting work. Some operations which require 2 or 3 H.P. when steam is first turned on, need only a fraction of a horse power after heating-up. The salesman must find out how much he can let the steam pressure fall at these times.

As a gas-fired boiler having a bunsen burner must receive most of its heat by convection, it would seem advisable that it should have a somewhat greater heating surface than a coal-fired boiler of the same horse power, even taking into consideration the fact that the heating surface is easier to keep clean. It must not be forgotten that one of the great advantages of gas-fired boilers is that it is so easy to save labour with automatic devices. In almost every case it will be advisable to use a regulator to hold the steam pressure steady. This will save labour and result in increased economy. If the appliance to be heated is part of a steam-loop system, any other device is seldom necessary. Where the condensation is not returned and low pressure is used, a water-feed regulator of the float-valve type may be installed with advantage. Where the condensation cannot be returned by gravity, a direct return steam-trap may be used. Good judgment must decide which devices are necessary, or such a high cost will be piled up that the order may be lost.

The question of safety can hardly be emphasized too much, as many are inclined to think that because the boilers are small they are not dangerous. It has been said that a cubic foot of heated water at 60 or 70 lbs. pressure contains as much energy as a pound of gunpowder, or enough to raise its own weight nearly a mile. So that if a boiler should explode it would not make much difference to a bystander whether it was 1 or 100 H.P. Every boiler should be provided with a reliable safety-valve. It is sometimes placed on the steam riser; but this is an objectionable practice, because if the boiler should prime, as upright boilers are liable to do, any dirt or scum on the surface of the water may be carried into the safety-valve, possibly causing it to stick. It is desirable that the water-gauge should be protected by a suitable fitting, to prevent injury from flying fragments in case of breakage. Gauge-cocks should generally be attached, even if there is a glass water-gauge. If a boiler is attached with short connections to a single appliance on the steam-loop system, they may be dispensed with. Every boiler should be provided with a pressure-gauge having a range at least 25 per cent. higher than the safety-valve load, and a syphon to prevent injury to the gauge by heat. No boiler should be without a good fusible plug.

The adjustment of the gas-burner is an important matter. It must have adequate head room, so that with the greatest consumption combustion will be perfect. There must be enough secondary air to ensure complete combustion, but as little excess as possible. The gas orifice must be large enough to supply sufficient gas, even at the lowest city pressure. If the pressure fluctuates widely, a governor may be employed. The higher the flame temperature, the more completely available will be the heat generated. If an automatic gas-regulator is used, there should be a bye-pass, locked to give sufficient gas at the lowest pressure, to prevent flashing-back in the mixer. Care must be taken to adjust it sufficiently low that when little steam is being used the steam pressure will not climb and open the safety-valve.

Before getting up steam, observe the water-level, and see that it is at the proper height; note the pressure-gauge; and try the safety-valve to see that it is free. The blow-off cock should be examined to ascertain that it is tight. When steam is up, the water-gauge should again be observed and blown through by top and bottom cocks. Note the water-level in the glass after blowing. The water should rise in a lively manner; sluggishness points to choking and danger. If the boiler has gauge-cocks, they should be tried. Test the safety-valve by lifting, and observe the pressure-gauge. The feeding of the boiler should be done as regularly and continuously as possible; and it is desirable to heat the feed water. Apart from other serious objections, the water-level should not rise above the top or fall below the bottom of the water-gauge fittings, as the openings are liable to be closed with scum. Though authorities say that deficiency of water does not cause so many explosions as is commonly believed, the greatest care should be taken to keep the water at a proper level, and maintain the gauges and feed apparatus in good order. If an attendant finds the water out of sight in the gauge, everyone should at once withdraw from the vicinity of the boiler and the gas be shut-off at the meter, as a serious accident is about to occur. The safety-valve should be tested at least once daily, to see that it works freely and at the proper pressure.

As already mentioned, vertical gas-fired boilers are very safe, provided they are kept clean. This is important, as any sediment usually settles right over the fire. The economy of returning all the condensation is between 5 and 10 per cent.; but its greatest advantage is in keeping the boiler clean. Generally speaking, a boiler which does not have the condensation returned should be cleaned out after every 100 hours' work. The hard scale should not be allowed to become more than 1-16th of an inch thick. Scale is objectionable, because it hinders transmission of heat, thus causing high fuel costs and danger of over-heating; and it conceals any corrosion which may be going on beneath it. A boiler should not be emptied for cleaning by blowing out under pressure. This is a serious strain on the seams, and bakes the scale on the hot metal. It is still more objectionable to blow-off this way and immediately run in cold water. The boiler should never be opened for any purpose unless it is certain that all steam pressure is off.

The principal factors determining the safety of a boiler are: (1) Its original construction, equipment, and installation. The responsibility for these is with the manufacturer and the gas company. (2) The proper maintenance and working of the boiler and accessories. After instruction, the purchaser must see to this. (3) The regular inspection of the boiler and fittings. We recommend this to be done by a Boiler Insurance Company. It may be objected that too many precautions are recommended, and that hundreds of boilers are getting along very well with hardly any care. The only way I can account for this is that the boilers are taken charge of by the same Providence which is said to look after children and drunken men. It is a task indeed; but think of the pleasures it gives, when taking a prospective purchaser to see a boiler already installed, to have the old customer helping to close the sale.

## The Purification of Gas by Heat.

Mr. Charles Carpenter, D.Sc., M.Inst.C.E., has had reprinted in book form the lecture which he delivered last June at the Liverpool meeting of the Institution of Gas Engineers, on the "Purification of Gas by Heat—A Century's Progress and its Lessons." This handy volume will certainly fully justify his hope that it may prove convenient to those who, like himself, find reference requirements ever outgrowing bookshelf capacity. The lecturer concludes his forword by remarking: "In the historical details I have given it will be seen how largely therein bulks the work of the Gas Light and Coke Company. If in this matter of purification it has been at last outstripped by a younger competitor in honours—the Company south of the Thames—it must be accorded ungrudging praise for the important part played during its century of incorporation in the development of gas manufacture. I should like, too, to take this opportunity of acknowledging the kindness shown and the help given to me by its engineering staff for a period of over thirty years." Of the book itself it need only be said that the style of its preparation must add to the pleasure of a study of the absorbing subject-matter which it contains.

# CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

## Benzol Recovery in Germany.

SIR,—In your issue of Oct. 27, under the heading of "The Gas Industry and the War," a paragraph appears which is an extract from the "Manchester Guardian" with regard to the position of Germany and her available supplies of benzol.

The figures given by the "Manchester Guardian" correspondent are totally incorrect, and give an entirely false idea of the quantity of benzol actually available. According to the correspondent, "it needs 17 tons of coal to produce a gallon of benzol, or 8 million tons a month to maintain the normal benzol supply." This statement is, of course, absurd. Crude benzol is obtained from coal at the rate of about 2½ gallons per ton of coal carbonized. This crude spirit can be used without further treatment for motor purposes; but such use is very undesirable, owing to the detrimental effect on the engine. For motor purposes, it is generally refined; and approximately 1½ gallons of motor spirit per ton of coal are obtained. This will, therefore, increase the "Manchester Guardian" correspondent's estimate by twenty-five times. You will appreciate what an enormous difference this makes with regard to the resources of the German Government.

The correspondent is also under some delusion with regard to the number of bye-product plants adapted for benzol recovery in this country. He says that only about one-third of such ovens are really adapted for benzol recovery. As a matter of fact, probably 90 per cent. of the ovens in this country are actually working in conjunction with the benzol recovery plants.

The letter seems to be another instance of the ignorance of lay journalists on technical matters.

G. S. COOPER.

92, *Harcourt Road, Sheffield,*
*Oct.* 28, 1914.

## National Gas Exhibition—Appeal for Funds to Meet the Deficit.

SIR,—I append a third list of contributions received towards the deficit in the accounts of the National Gas Exhibition.

The position now stands as follows:—

| | | |
|---|---|---|
| Deficit at the 10th of July, 1914, as per statement of accounts published | | £3455 5 6 |
| Expenses in printing and issuing report, accounts, and appeal to non-subscribers | | 97 14 8 |
| | | £3553 0 2 |
| Contribution by British Commercial Gas Association | £1000 0 0 | |
| Result of appeal, including list now published | 374 5 0 | |
| | | 1374 5 0 |
| Existing deficit | | £2178 15 2 |

There are still over a thousand undertakings in the country which have not subscribed.

Will the managers of these undertakings kindly bring the above facts to the knowledge of their Boards and Committees, and give the case their hearty support?

W. T. DUNN, Hon. Secretary,
Institution of Gas Engineers.

*Oct.* 28, 1914.

FURTHER CONTRIBUTIONS FROM UNDERTAKINGS WHICH HAVE PREVIOUSLY SUBSCRIBED.

| | |
|---|---|
| Newcastle (Staffs.) Corporation | £1 1 0 |
| Cheltenham Gaslight and Coke Company | 10 0 0 |
| Seaham Gas and Lighting Company | 3 3 0 |
| Exeter Gaslight and Coke Company | 10 0 0 |
| Newmarket Gas Company | 1 0 0 |
| Wilmslow and Alderley Edge Gas Company | 1 1 0 |
| Great Yarmouth Gas Company | 2 1 0 |
| Middlesbrough Corporation Gas Department | 5 0 0 |
| Gloucester Gaslight Company | 5 5 0 |

CONTRIBUTIONS FROM NEW SUBSCRIBERS.

| | |
|---|---|
| Stockton-on-Tees Corporation Gas Committee | 10 0 0 |
| Newton-on-Ayr Gas Company, Limited | 5 5 0 |
| Featherstone Gas Company | 2 2 0 |
| Leyland Gas Company | 5 5 0 |

## Use of Electricity in Gas-Works.

SIR,—You might add to your list of users of electricity in gas-works ["JOURNAL," Oct. 20, pp. 123-5] the name of the Redhill Gas Company, with the following plant for driving the Guest-Gibbons charging machinery and the elevators and breakers for coal: Two enclosed single-crank steam-engines (vertical) by Sisson and Co., of Gloucester, 31 H.P. at 600 revolutions and 70 lbs. per square inch steam pressure, each direct-coupled to a Siemens type 240 "F.C." compound-wound dynamo, 20 kilowatts, 91 amps., 220 volts.

I do not see in your list the Hornsey Gas Company, Chester Gas Company, and Colwyn Bay Gas-Works. I know these have electrical plants. A very large installation is also under construction at the Gillingham works of the Rochester, Chatham, and Strood Gas Company, and a plant is also being installed at the new Herne Bay Gas-Works.

W. H. BENNETT, Engineer and Manager.

*Redhill; Oct.* 26, 1914.

## The Destruction of Coke-Oven Bricks by Salty Coals.

SIR,—I was much interested in the letter of Mr. W. Colquhoun in your issue of Oct. 27.

This gentleman may rest assured that I did not make the statement in the original article without having solid facts to go upon. Surely it is not because coal is high in sodium that a large amount of fixed ammonia is produced. Is it not rather due to the presence of a large amount of chlorine? I am quite aware of the fact of the increase of the alkaline constituents after vitrification. But I make a distinction between vitrification and corrosion; and it is an absolute fact—I have it on the authority of the responsible party—that bricks containing 92 per cent. of silica have suffered no corrosion, while bricks containing 80 per cent. have crumbled away.

I am afraid that the subject is far more complex than Mr. Colquhoun would have us believe. If his explanation were correct, there would be no such phenomena as he refers to where corrosion occurs with 0·132 per cent. of salt in one case and no corrosion with 0·35 per cent. in another. Why has the remedy not been applied here? I quite agree that the part played by water in carbonizing wet coal is as yet imperfectly understood.

The whole subject is one worthy of attention.

THE WRITER OF "EVENT AND COMMENT."

*Oct.* 28, 1914.

# REGISTER OF PATENTS.

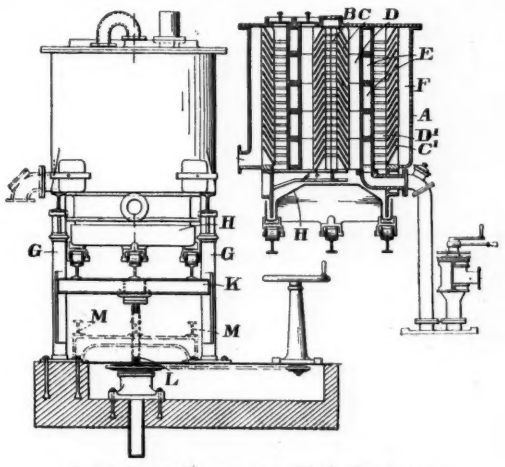
## Distilling Coal or Other Solid Material.

HUGHES, T., of Danes Inn House, Strand.

No. 23,418; Oct. 16, 1913.

This invention has particular reference to the low-temperature distillation of coal; its object being "the construction of a retort simple in form and efficient in operation."

Various constructions of vertical coke-ovens have, the patentee remarks, been proposed in which the products of distillation have passed through openings or passages in louvred walls round a central solid core of the material to be coked, or else within an annular column of the material heated from the outside. A retort according to the present invention is so arranged that a layer of large area but shallow depth of the material to be treated is supported against each side of a hollow wall containing heating flues by a wall or partition having openings or passages through which the products of distillation can pass to an outer chamber, which is preferably formed by a metal casing to facilitate condensation. The wall or partition which supports the thin layer of material against the heating surface is conveniently in the form of a louvred casting "the angle of the louvres being such that there is practically no tendency for the finely-divided material to flow out through the openings."




**Hughes' Low-Temperature Distillation Retort.**

An elevation is given of one construction of retort according to this invention, and a vertical section partly on the line X.

This annular form of retort has a cast-iron casing A provided with a central gas-collecting chamber B surrounded by a louvred ring or annulus C. Outside this ring is an annular chamber or space D for the material to be distilled, surrounded by a heating chamber made of a series of superimposed rings or flues E provided with partitions and openings to regulate the course of the heating gases or gas-flame. Outside the heating chamber thus formed is another annular chamber or space $D^1$ for the material to be distilled; and the outer wall of this chamber is formed by another louvred partition $C^1$, the openings in which communicate with an outer gas-collecting space F within the outer casing. The retort is supported on columns G, and is furnished with a removable domed bottom H provided with a seal at its edges, and furnished with runners or rollers resting upon rails supported on a frame K. This frame can be raised or lowered in guides by gear L, the arrangement of which is such that when it is wished to remove the charge from the retort the frame and consequently the bottom of the retort are lowered until the rails are in line with other fixed rails M. The bottom can then be pushed on its rollers from one set of rails to the other, and the material removed from the retort. As the movable bottom is domed, some of the material from the retort falls off as soon as the bottom is lowered; but the remaining portion can be readily dislodged, more particularly if the cross sections of the chambers D $D^1$ are such that the column of material is tapered slightly from the bottom upwards.

The retort is said to be suitable particularly for the low-temperature distillation of dross or small coal from coal mines. As the apparatus is intended for comparatively low-temperature distillation rather than for the production of coke, the retort is constructed so that there are two layers of material to one set of flues; the flues being between the

layers of material supported on the outside by the louvred walls. Outside these walls again, and forming the exterior casing, is the chamber for receiving the products of distillation—such chamber "preferably being made of a metal casing which, by its position and construction, facilitates condensation." The material is thus heated from the inside, and the products of combustion pass through a zone of diminishing heat to the external chamber.

## Counting Mechanism of Meters.

BERRY, J., MAYLOR, J. A., and GLOVER, W. T., of Oldham, and METERS LIMITED, of Manchester.

No. 25,383; Nov. 6, 1913.

This invention relates particularly to meters for delivering gas under various pressures, and in which "means are provided for the adjustment of the indicating mechanism so as to ensure the registration thereby of the correct volume of gas when expanded to the ordinary pressure"—"variable speed-gearing for compensating for variations in the pressure of the gas passing through the meter."

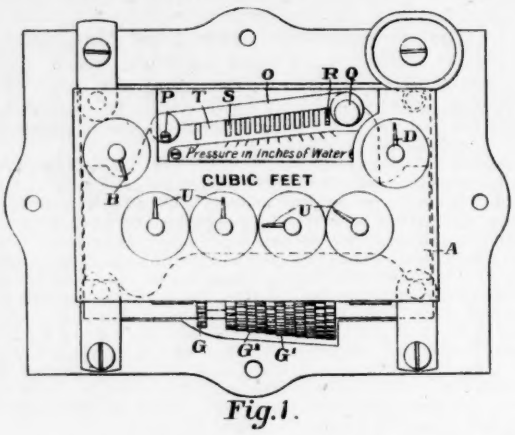



*Fig. 1.*

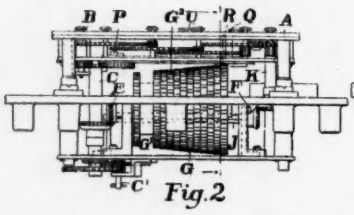



*Fig. 2*

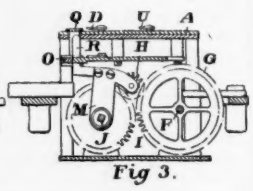



*Fig 3.*

**Berry, Maylor, and Glover's (Meters Limited) Counting Mechanism of Meters.**

Fig. 1 is an elevation of the counting mechanism. Fig. 2 is an inverted plan view of the mechanism. Fig. 3 is a sectional end elevation on the line X.

The dial-plate A has indicating circles on it and pointers, as usual. One of the circles, with its pointer B, serves to indicate the actual volume (independent of pressure) of the gas passing through the meter; being actuated directly from the metering mechanism by the spindles C $C^1$ and connected gearing. The circle and pointer D indicate the volume that the gas measured by the dial and pointer B would occupy when expanded to the normal pressure; the pointer being actuated from the spindle C, through bevel wheels E, and a spindle F carrying a plurality of gear wheels G of different diameters. A pinion H, capable of being engaged with any one of the gear wheels, rotates a wheel I on a spindle J; the latter driving the pointer through bevel-and-spur gearing and the spindle K.

The pinion H is carried by a part M, which embraces the wheel I and is supported on the spindle J. When it is desired to vary the gear-wheel in the multiple wheel G with which the pinion H engages, the arm O, pivoted at P, is turned about its pivot after the locking stud Q has been removed; and the end R of the part M is transferred to any desired one of the slots S in the plate T. The part M carries the pinion H and wheel I longitudinally of the wheel G to the position corresponding to the desired slot in the plate.

Thus, for example, if the meter is being tested, or the gas pressure is normal, the pinion H is caused to engage the wheel $G^1$, and the two pointers B and D rotate at the same speed. But if the gas pressure be 60 inches of water, then the part M is moved to place the end R in the correct slot S. The pinion H may then mesh with the wheel $G^2$. The pointer D now travels at a faster rate than the pointer B, so as to compensate in the counting pointers U, which are rotated from the pointer D, for the increased pressure of the gas.

The slots S in the plate T are arranged on an incline, so as to compensate for the different diameters of the wheels forming the multiple gear wheel G.

## Filling Skips Automatically.

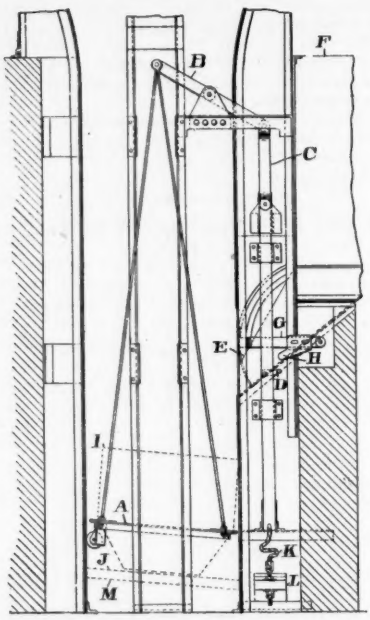
ROBERT DEMPSTER AND SONS, LIMITED, and MITTON, W., of Elland.

No. 28,118; Dec. 6, 1913.

This automatic apparatus for delivering a predetermined weight of coal, coke, or other material to (say) a skip is of the type in which the weight of the receptacle, when placed upon a platform which is counterbalanced by an equivalent weight, causes a sufficient movement of the platform to affect thereby the opening of the door of a hopper, bunker, or other storage device. The platform is then brought to rest by means of a second counterweight equivalent to the weight of the material required in the skip; and when such equivalent weight has been added to the skip or platform, a further movement of the platform brings about the closing of the door.

The platform is suspended from one arm of a pivoted lever, the other arm of which actuates a sliding bar, with, preferably, a vertical movement in guides. The foot of the bar is connected by a normally slack rope to a heavy counterweight; and the upper part of the bar carries a catch adapted to engage a projection on the lever of a quadrant door controlling the outflow of the coke or other material.

The weight of the skip when placed on the platform causes a certain descent of the platform and a rocking of the lever, which latter lifts the bar so that its catch causes the quadrant door to be drawn back from the hopper outlet, when the filling of the skip from such outlet begins. When the filling reaches a certain point, the further descent of the platform causes the catch on the bar to be lifted clear of the projection on the door, which therefore closes automatically. On the removal of the skip, the counterweight brings down the bar, the catch on which, being capable of giving way in one direction only, passes the projection on the door, when the apparatus is ready for the next skip to be placed on the platform and filled.




**Mitton's (R. Dempster and Sons) Skip-Filling Arrangement.**

A is the platform referred to, suspended from the pivoted lever B, and connected to the vertically slidable bar C, on which is a catch D adapted to yield to pressure upon its under surface, but rigid against pressure on its upper surface. The outlet shoot E of a hopper F is normally closed by a quadrant door controlled by a G pivoted lever, on which is adjustably secured a lug or projection H. Upon an empty skip (see dotted lines I) being placed upon the platform, the platform descends to the position J, causing the lever B to raise the bar C to the extent permitted by the rope K connecting the bar with the weight L. In this movement, the catch D engages the projection H, and thereby causes the opening of the door E, allowing the coal or other material to run down the shoot into the skip I. When the increased weight on the platform, consequent on the filling of the skip, has caused the platform to overcome all the resistance of the counterweight, and descend to the position M, the catch D slips past the projection and the door closes by gravity, stopping the outflow of the coal.

## APPLICATIONS FOR LETTERS PATENT.

21,191.—DUCKHAM, A. M'D., "Discharging vertical gas-retorts." Oct. 19.

21,258.—HODGSON, J. L., and GRAY, F., "Fluid meters." Oct. 20.

21,301.—SHEWRING, F., "Tanks or receivers for liquids with solids in suspension." Oct. 21.

21,381.—PROSSER, H R., "Union for gas-pipe." Oct. 22.

21,391.—WILTON, G., "Saturators for making sulphate of ammonia." Oct. 22.

21,470.—CHAMBERS, W. H., and YEADON, J. A., "Coal-conveyor." Oct. 24.

Mr. W. T. P. Cunningham, the General Manager for England and Wales of the First Dutch Bog Ore Company, Limited (Erste Hollandsche Yzererts Maaty), writes saying that there seems to be an impression generally among gas engineers and managers that Dutch bog ore is not available during the present war, and asks that we should correct the impression through the medium of the "JOURNAL." The Company tell us they are regularly making shipments to various British and Irish ports, and while conditions remain as at present they hope to continue to do so.

# LEGAL INTELLIGENCE.

## ELECTRICITY CHARGES AT LONG EATON.—APPEAL OF THE DISTRICT COUNCIL DISMISSED.

### SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

**Thursday, Oct. 29.**

(*Before* THE MASTER OF THE ROLLS *and Lords Justices* KENNEDY *and* SWINFEN EADY.)

**Long Eaton Urban District Council v. The Attorney-General, at the Relation of the Long Eaton Gas Company.**

This was an appeal from the decision of Mr. Justice Sargant in the action brought by the Attorney-General, at the relation of the Long Eaton Gas Company, against the Long Eaton Urban District Council, the proceedings in connection with which were reported in the "JOURNAL" for April 7 and 14 and May 19 last (pp. 51, 130, and 511).

Mr. VESEY KNOX, K.C., Mr. MARTELLI, K.C., and Mr. COURTHOPE MUNRO, K.C. (instructed by Messrs. Lees and Co., for Mr. E. Williams, of Long Eaton), appeared for the appellants. Mr. MARK ROMER, K.C., and PERCY WHEELER (instructed by Messrs. R. W. Cooper and Sons, for Messrs. Fraser and Son, of Nottingham) represented the respondents.

Mr. VESEY KNOX, in opening, said the case raised a very important question as to the interpretation and application of sections of the Electric Lighting Act, 1882, which dealt with inequality and undue preference. The appeal was from a decision given last May by Mr. Justice Sargant; and the facts (summarizing them shortly) were these: The Long Eaton Urban District Council were electrical undertakers acting under a Provisional Order. They had in force a tariff according to which large factories were supplied at the price of ¾d. per unit for power and 3d. per unit for energy used for light; and they decided that, after a certain date, factories not wholly lit by electricty should pay 1d. per unit for power, instead of ¾d. The action was brought by the Attorney-General on the relation of the Long Eaton Gas Company; and so far as he knew there was no precedent for a competing trader being the person to raise the question of undue preference and inequality. Such a question was usually raised by a consumer. The learned Judge decided that what was being done was contrary to the provisions of the Electric Lighting Act, and he had laid down very clearly the law, as he conceived it to be, as to the interpretation of the two relevant sections of the Act of 1882—viz., sections 19 and 20. Section 19 provided that:

> Where a supply of electricity is provided in any part of an area for private purposes, then, except in so far as is otherwise provided by the terms of the Licence, Order, or Special Act authorizing such supply, every company or person within that part of the area shall, on application, be entitled to a supply on the same terms on which any other company or person in such part of the area is entitled under similar circumstances to a corresponding supply.

This section gave to the trader a right to obtain a supply on equal terms to those which had been given to another trader. Section 20 was the undue preference section. It provided:

> The undertakers shall not, in making any agreements for a supply of electricity, show any undue preference to any local authority, company, or person, but, save as aforesaid, they may make such charges for the supply of electricity as may be agreed upon, not exceeding the limits of price imposed by, or in pursuance of, the Licence, Order, or Special Act authorizing them to supply electricity.

The result of Mr. Justice Sargant's judgment was that practically in considering whether or not a charge was unequal, or an undue preference created, the only thing that could be looked at was the relative power of the supply to the undertaker, and that no other considerations were admissible. This view had created something like consternation among local authorities; and if this was the law it must be altered, or else electric supply could not possibly be continued. He would ask the Court to consider, first, the subject-matter of the Act and certain general economic considerations which must necessarily arise in fixing tariffs or in making contracts for electric supply. A bigger business, other things being equal, could be conducted more cheaply, and to greater public advantage, than a smaller business. For this reason it might sometimes be advantageous to take on business which only just paid its cost, if one could not get it otherwise. This was true in all businesses; but especially in an electric lighting business. In the first place there was the distributing system—the capital expended on mains; and here the capital expended on mains was as great as that expended on machinery. In putting up machinery one would not go beyond what was required at the moment; but in laying down mains, the remote future was looked at. Therefore it was essentially important to get more current through the mains—to get the mains used to their full capacity. Even as to machinery, the larger unit was much more economical—it produced electricity at much less expenditure of coal per unit—and anything which enabled the station to get away from small units of power, and to use larger units, was an advantage. It was the object of every successful purveyor of electricity throughout the country to get away from the smaller units and to use larger units. There were certain standing charges which were inevitable, whatever the size of the undertaking; and it was important to distribute them over as large a volume of business as possible. This was the first consideration which had to be taken into account in dealing with any legislation which sought to regulate or control the price charged for electricity—one was dealing with something which could only be successful if the business was extended. The second consideration, which Mr. Justice Sargant had overlooked, was that this business was extremely competitive, and therefore very difficult to get. It might be said there was no branch of electric business which was not extremely competitive. The gas companies competed for light, and to a less degree for power; there was competition by steam for power; and there were also separate installations both for light and power.

Mr. ROMER said he was very reluctant to interfere, but his learned friend was telling the Court things which he knew from his own experience, not things which appeared in evidence.

Mr. VESEY KNOX said these things could not be overlooked in considering the nature of the public service which had to be regulated under the sections in question, and there was a good deal in the evidence about the importance of competition. If they were overlooked, the result would be bankruptcy. Competition was not speculative but actual; and where there was the daily difficulty of getting business and keeping it against competition, any view of the legislation which forbade one to consider competition must necessarily produce results which were uncommercial and commercially disastrous. It would require very clear and strong words in the legislation to justify the Court in deciding that the consideration of competition was to be entirely overlooked in interpreting these sections. To put it in another way, in fixing the price the learned Judge had said the Council could only look at what the electricity cost, whereas one ought to look at what it was worth to the consumer.

The MASTER OF THE ROLLS: You can alter the price from time to time.

Mr. VESEY KNOX: Quite so; but in making the scale of charges the Judge said they were only to have regard to the relative cost of the respective services—overlooking what the service was worth to the consumer. Electricity was only worth to the user what he could get the equivalent service for—viz., gas. The next consideration was the conditions of use of electricity were extremely various, and the conditions of cost were extremely various and very difficult to determine. The great factor which made electricity differ from most other public services was that the intermittency of demand could not be economically compensated by storage. For this reason the cost of supply varied very much; and it was very difficult even for an expert to explain the reason. As the intermittency of demand could not be compensated by storage, it was important to get customers to take a supply at a time when it could not be used for other purposes; and engineers had laid down a certain rule-of-thumb which was called the load factor. This meant the ratio of units delivered to consumers to the possible output of the station if the maximum load was constantly in use throughout the year or other period of supply. The idea was to supply electricity throughout the year; and in this case he would have a load factor of 100 per cent.

Mr. ROMER: In the Court below, we used the load factor as representing the proportion that the actual supply bore to the maximum demand which the customer could make.

Mr. VESEY KNOX said the load factor was the ratio between the load you did and could determine if you had the maximum load represented.

Mr. ROMER said it was obvious from the language of the learned Judge, when delivering judgment, in what sense load factor had been used by plaintiffs.

Mr. VESEY KNOX said as a matter of fact there was always a loss in transmission, and the number of units consumed could not ever come up to the possible total output of the station. Therefore it would not be possible to have had a number of units supplied, or consumed, amounting to 5,764,000. The load factor used in this way was a rough method of getting at whether or not the machinery and distributing plant were in the most economical use. The load factor might be taken out for a year, though in this particular case it was taken for a quarter; and it was a useful indication of whether or not the machinery was being economically used. This did not carry one the whole way, as the diversity factor had to be taken into account—the ratio of the actual load on the feeders to the maximum possible demand of all consumers.

Lord Justice KENNEDY said it appeared from the circular that the Council were proposing to do what they were not justified in doing—viz., giving a preference. Even the most ingenious engineer could not put a different meaning on the circular.

Mr. VESEY KNOX admitted he could not succeed if he could not justify the circular.

The MASTER OF THE ROLLS: You must stand or fall by the circular.

Mr. VESEY KNOX said quite so, though perhaps the declaration might be modified. His contention was that, in fixing a tariff, one had to look broadly at all possible cases, and that it was not to be held unjustifiable because there were hard cases under it.

Lord Justice KENNEDY: The question is whether the charges are illegal.

Mr. VESEY KNOX said he justified the circular in the sense that, in making a tariff, one might make some preference but not an undue preference.

Lord Justice SWINFEN EADY: When both customers are taking under similar conditions the same amount of current for power and light?

Mr. VESEY KNOX said that under any tariff there must be large differences in certain cases. It was scarcely possible to have a case where the price did not vary much compared with the cost of service. Supposing cost to be the basis, then, unless a separate charge was made in each case, the tariff must produce certain cases of hardship or prejudice, which could not be justified on the basis of cost. He did not say he could justify in every instance the application of this distinction; but, having regard to the difference in cost, whatever tariff one had, it would produce some inequality which, on the basis of cost, could not be justified.

Lord Justice SWINFEN EADY: Here you introduce an outside factor altogether.

Mr. VESEY KNOX said that was a separate consideration. His contention was that one was justified in introducing an outside factor if there was a good commercial reason for it, having regard to all the circumstances of the case.

Lord Justice KENNEDY: The learned Judge's view appears to be

that you must not allow "commercial element" to come in so as to differentiate between certain people.

Mr. VESEY KNOX said no doubt that was the point he had to meet. Under the Statute they were allowed to take into account whether the circumstances were or were not similar; and he submitted the learned Judge was wrong in law in saying that one could not take into account the element of competition as one of the things which ought to regulate the price and which might allow one to give a preference to one consumer over another.

Lord Justice SWINFEN EADY: Your point is this—that where you can justify an undue preference for commercial reasons the Act allows you to do it.

Mr. VESEY KNOX: I say, in considering whether or not there is an undue preference, any good commercial reason is a factor which ought to be taken into account.

Lord Justice SWINFEN EADY: If there were no other circumstances.

Mr. VESEY KNOX: The Judge has held we are not to take competition into account; and I think he has decided against the weight of evidence. It was the duty of the undertakers, in order to give the greatest amount for public service, to get business without unduly prejudicing any individual. They were not entitled, of course, to give a special favourable price to the Chairman of the Council or to one of their supporters.

Lord Justice SWINFEN EADY: Why not; if you can justify it on good commercial grounds?

Mr. VESEY KNOX said there was no reason why they should not. The principal point of law was whether or not the element of competition was an admirable reason for making a difference in the charge—whether it was a thing to be taken into account in deciding whether a difference in charge should be made. Having read the judgment of Mr. Justice Sargant *in extenso*, Counsel submitted that the Judge had misdirected himself as to the things to be taken into account in considering whether the preference was an undue one.

The MASTER OF THE ROLLS said this appeared to be quite irrelevant unless the circular could be justified.

Mr. VESEY KNOX thought they had first to consider whether other things besides costs were to be taken into account.

Lord Justice SWINFEN EADY said his view was that all they had to do was to decide whether the declaration pronounced by the Judge was right, having regard to the terms of the circular.

Mr. VESEY KNOX proceeded to call attention to the figures, with a view of showing that the business had been energetically carried on.

The MASTER OF THE ROLLS thought this had no relevancy to the issue to be decided by the Court.

Lord Justice KENNEDY said the only question was whether the circular could, as a matter of law, be supported. The fact that the works had been excellently conducted had nothing whatever to do with the point.

Mr. VESEY KNOX said if this was the view of the Court, he would not pursue the matter further.

Lord Justice SWINFEN EADY: Assume all the facts in your favour, the case really stands in this way. Under your circular you propose to supply current to two persons in the same quantity and under the same conditions, whether for power or lighting, subject only to this—that one of the two has an additional machine worked with gas, and therefore you say you will charge him more than the other man.

Mr. VESEY KNOX said he could not contend that there might not be some cases of hardship.

Lord Justice SWINFEN EADY: You mean illegality?

Mr. VESEY KNOX said the question had to be argued according to its general aspect.

Lord Justice SWINFEN EADY: What is the ground upon which you go—that, given a supply of current to two persons under identical circumstances and conditions, you can charge one more than the other because he also uses a gas-engine?

Mr. VESEY KNOX said he thought if a mill owner took energy for power as well as light he ought to be given some advantage. If hard cases arose, the Council would not enforce the circular.

Lord Justice SWINFEN EADY: Is there any reason why you should charge one man more because he has a little engine which is worked by gas?

Mr. VESEY KNOX: Perhaps not. In certain cases if the right was enforced there might be some hardship; but where possible, a differentiation should be made. It would not be good business to supply at ¾d. per unit for power unless to customers for light as well.

The MASTER OF THE ROLLS: I think the question put to you by my brother Swinfen Eady is unanswerable.

Mr. VESEY KNOX thought it would be very difficult to make any tariff. Was it not a material reason for differentiation in the case of cost that one took the energy for light and power and the other only for light? This was really the point in the case.

The MASTER OF THE ROLLS said it appeared to be an attempt to crush the life out of the Gas Company.

Mr. VESEY KNOX said the problem which the Council had to deal with in controlling the undertaking was to see whether the charge of ¾d. could be maintained without some addition. The average cost of the power was not the cost of the electricity sold; and it was necessary for the Council to consider whether or not they could not make a modification.

Lord Justice SWINFEN EADY: But you must keep within the law in whatever you do.

Mr. VESEY KNOX: No doubt.

Lord Justice SWINFEN EADY reminded Counsel that he had not yet touched at all upon the only important question in the case—viz., was the circular legal?

Lord Justice KENNEDY said, in his opinion, the circular showed an undue preference in the case of certain customers.

Mr. VESEY KNOX argued that it was fair to differentiate between customers who took current for light and power and those who only took it for light.

Lord Justice SWINFEN EADY: You say, although the area may be the same and the circumstances similar, you will not supply on the same terms because of some irrelevant prejudice.

Mr. VESEY KNOX: That is so.

Lord Justice SWINFEN EADY said this appeared to be the only point in the case; and he expressed surprise that it had occupied so much time.

Mr. VESEY KNOX was sorry if he had wasted the time of the Court. On the question of whether there was an undue preference, he contended that the learned Judge had misdirected himself.

Lord Justice SWINFEN EADY suggested that Counsel should deal with the point that, where the circumstances were identical, what was the reason for preferring one over the other who had his office lighted by gas?

Mr. VESEY KNOX said one could not have differentiation without causing some injustice. If it be the law that a differentiation like this had to be defended in its effect in every case to show there would be no unfairness, he was afraid he could not carry the case that length. His submission was that one must look at differentiation as a whole.

Mr. MARTELLI followed on the same side, and contended that a man who lighted the whole of his factory by electricity, with the exception of a jet of gas in the office, was entitled to a reduction, but in the converse case a man was not. It must not be forgotten that the Council had never acted on the circular. What was forbidden by the Statute was supplying on different terms; the Court could injunct the Council from committing a breach of the sections. But they were not supplying on different terms, and had not entered into agreements to give an undue preference. The Court ought not to be asked to say that the Council should not do something which they had never done, or even threatened to do. There were many other cases depending upon this, and it would be deplorable if the case went off on the particular wording of the circular. The circular was merely to prevent an abuse of the tariffs; and he submitted that the order appealed from was not justified by the evidence. The case had really got into a side-track; and the point argued in the Court below had been lost sight of. He hoped, after all the expense that had been incurred, the Court would decide the main issue between the parties. On the general question there was a great deal to be said; but if the Court did not wish to hear him, it was useless to go on. The case in the Court below was rested upon three grounds: (1) That competition was not to be taken into consideration; (2) that the onus was upon the defendants; and (3) that the cost was less to the Council in a case where electricity was taken both for light and power. He hoped the Court would not let the case ride-off on an issue which had not been raised in the Court below.

Their LORDSHIPS, without calling on Counsel for the respondents, proceeded to deliver judgment, dismissing the appeal with costs.

### The Judgment.

The MASTER OF THE ROLLS: This is an appeal from Mr. Justice Sargant, who had made a declaration that "the defendants, in making the differentiation referred to in the circular dated the 25th of September, 1911, in the pleadings mentioned between those consumers of the defendants' electricity of over 6000 units per quarter for power who do and those consumers who do not take their lighting exclusively from the defendants, are acting in breach of the provisions of sections 19 and 20 of the Electric Lighting Act of 1882." Then there is liberty to apply for an injunction.

Now, before going further, I wish to deal with one point which Mr. Martelli has raised. He says that, whatever the circular may say, we never have done it. This seems to me to be an absolutely irrelevant remark, if Mr. Martelli will pardon me for saying so. It is as old as the hills that if a man threatens that he intends to do something, and asserts a right to do it, the Court will grant an injunction to restrain. It is wholly irrelevant to say whether he has done it or has not.

Now, the Long Eaton Urban District Council have been the undertakers of an electric light works at Long Eaton for some years; and it has been a very prosperous concern. They supply electricity for both lighting purposes and for power; and on the 25th of September, 1911, they issued this circular, which is the circular referred to in the order:

> Dear Sir,—I am directed by my Council to inform you that the following resolution has been adopted with reference to the price charged for electricity to power consumers, and which will take effect as stated therein—viz., Revision of Electricity Charges. Committee, having fully considered this matter, recommend that the present scale of charges remain in force where power and lighting are both taken exclusively from the Council's electricity mains; but in cases where electricity supply is taken for power only, or for power and partial lighting, the lowest scale of charges, where the number of units consumed during any quarter exceeds 4000, shall be 1d. per unit. And, otherwise, according to existing scale. Such amended charge to commence the 1st of January, 1912."

Have they withdrawn that circular? No. Did they in their pleadings in this action say: "We undertake not to act upon it; we admit it is wrong?" No. By their defence, they say it was quite right, and that they are justified in acting on it. I cannot listen for a moment to the suggestion that if the circular was wrong, the declaration was improper because they in fact have chosen not to enforce it in a number of instances, or even in any case. They have no right to threaten, or intend, to do that, if the circular is wrong. As to whether the circular is right or wrong I feel bound to say, treating the matter seriously, it seems to me to be so plainly wrong that I do not propose to waste many words upon it. What does section 19 of the Act say? It says:

> Where a supply of electricity is provided in any part of an area for private purposes, then, except in so far as is otherwise provided by the terms of the Licence, Order, or Special Act authorizing such supply, every company or person within that part of the area shall, on application, be entitled to a supply on the same terms on which any other company or person in such part of the area is entitled under similar circumstances to a corresponding supply.

Take the instance (and I should have thought not an uncommon instance) which Lord Justice Swinfen Eady put to Counsel: "There

are two factories, similar in situation, similar in extent, both of which are supplied with electricity for lighting and for power. Is there any reason for justifying a different charge to either of these men because one of them in his manufactory may have a wing of the factory, or another small factory, which is not supplied with electric lighting, but is supplied with gas, or acetylene gas, or whatever it may be?" It seems to me that this is plainly and directly in the teeth of section 19, which says that each of these two is to be entitled to a supply on the same terms. They are not supplied on the same terms, although the circumstances are similar. There is no possible justification, as it seems to me, for differentiation between the two. I think also that this case falls within section 20, which says:

> The undertakers shall not, in making any agreement for a supply of electricity, show any undue preference to any local authority, company, or person; but, save as aforesaid, they may make such charges for the supply of electricity as may be agreed upon, not exceeding the limits of price imposed by, or in pursuance of, the License, Order, or Special Act authorizing them to supply electricity.

Now, take the case, not of a man who has one single burner, as Mr. Martelli suggested we should do, but the case of a substantial user of gas by one of two men—the circumstances being in other respects absolutely identical. Is there any justification for that? I think not.

The only other point which the learned Judge has decided is that, in making the differentiation referred to in the circular, they are acting in breach of the provisions of sections 19 and 20 of the Electric Lighting Act, 1882. In my opinion it is impossible really seriously to doubt that the declaration is perfectly right; and I cannot understand the argument that we ought to consider the propositions which were laid down by the learned Judge. It is not our duty to go into a matter of this kind. All we are concerned with is: "Is the order which is appealed against right or wrong?" In my opinion, the order appealed against is perfectly right, and this appeal must be dismissed with costs.

Lord Justice KENNEDY: I am of the same opinion.

Lord Justice SWINFEN EADY: I agree.

## New Tredegar Gas and Water Company's Assets.

Last Tuesday, Mr. Justice Neville decided a summons taken out by the Liquidator in the voluntary winding up of the New Tredegar Gas and Water Company, asking for directions as to the distribution of surplus assets, amounting to about £8000. The question for decision was whether the original shareholders took the surplus, or whether the holders of subsequent issues shared *pari passu* with them. The Company, which had been very successful, was formed in 1873, under the Act of 1862, with a nominal capital of £4000, divided into shares of £5 each. There was no question as to the regularity of this issue; but with regard to subsequent issues, bringing the capital up to £13,235, it appeared that certain formalities had not been complied with in passing the resolutions increasing the capital. The Local Authority had acquired the undertaking of the Company for £23,415; and after each shareholder had received 20s. in the pound there remained a balance. Representatives of each issue of shares were before the Court; and his Lordship, after hearing considerable argument, decided that all the shares should rank equally for dividend in the surplus assets.

## Nuisance from a Gas-Engine Exhaust.

At the Lancashire Chancery Court at Manchester, last Friday, Vice-Chancellor Stewart-Smith, K.C., gave judgment in an action brought by Mr. T. Seddon, the owner of four cottages at Irlams-o'-th'-Height, and Frederick Montier and William Lamb, the tenants of two of them, for an injunction to restrain Messrs. W. T. Ellison and Co., engineers, from continuing a nuisance caused by the noise made by the exhaust-pipe from a gas-engine, which was brought through a wall in defendants' premises into a passage near the cottages. The Vice-Chancellor, who had had an independent report made, and had himself visited the place, said the evidence was conflicting; but he had come to the conclusion that the irregular series of puffs and explosions of the gas-engine constituted a nuisance to the plaintiffs. There was no doubt that the noise was distinctly audible inside the houses. It was less audible when the windows were closed; but in the warm weather the doors of houses of this class were generally open, and at some time during the day the windows were also open. There was no legal obligation upon a man to keep his doors and windows closed and seal his house for the commercial advantage of his neighbour, or to protect himself from nuisance by making his house a corked bottle. He therefore granted the injunction. For the defendants, it was urged that it would take some time to make the necessary alterations; and the operation of the injunction was suspended for a month.

## Rating Appeals by the Boston Gas Company.

A special sitting of the Holland (Lincolnshire) Quarter Sessions was held at Spalding last Thursday for the hearing of appeals brought by the Boston Gas Company against the Boston Board of Guardians and the Overseers of the Poor of Boston, Skirbeck, and Skirbeck Quarter in respect of the assessments on the Company's property. In 1885 the assessment amounted to £1497, and in 1911 it was raised to £2300. The net profit of the Company in 1885 was £2799, and in 1912 £2813; and it was argued that the increasing profit did not warrant the increased assessment. On behalf of the respondents, it was contended that a large sum of money had been spent by the Company in improving the works. The case was settled by agreement; the rateable value of the property being fixed at £2000.

**Ripon Gas Department.**—A half-yearly report on the working of the Ripon Gas Department shows that the revenue was £4124, as compared with £4570 in the corresponding period of last year. The expenditure was £4163, as compared with £3216. The balance in the hands of the Treasurer is £489, as against £1844.

# MISCELLANEOUS NEWS.

## NOTTINGHAM GAS FINANCE.

An ominous reminder was forthcoming at the last meeting of the Nottingham City Council, held on the 26th ult., as to the increasing danger attendant upon unduly trenching on gas reserve funds. The subject is no new one; but its latest exemplification comes in a striking form after a series of previous warnings at Nottingham extending back to the time when the late Alderman J. Barber was Chairman of the Gas Committee. The profits of the undertaking have for many years been heavily relied upon in the reduction of the rates; £39,000 being again taken last year. Apart from this, however, there has also been a considerable call made from time to time upon the gas reserves. Now, in a period of exceptional stress, the Council were asked to entertain the idea of a further annexation of funds in aid of a project which bears no direct relation to the gas concern; and the Chairman of the Committee (Alderman Albert Ball) uttered a protest which was in consonance with the views of a notable predecessor in the office. The Trent Navigation have formulated a plan for widening and deepening the river at a cost approximately of £150,000, of which the Council were asked to contribute £100,000; the remainder being promised on certain terms by the Development Commissioners.

The proposal of the Special Committee appointed to deal with the subject was that the gas, water, and tramways undertakings should be placed under the requirement to provide that portion of the cost for which the Corporation was to be responsible; but it was made clear by Alderman Ball that, in any event, it would be the oldest of the municipal trading concerns which, in the circumstances, would have to provide the major portion of the money. He pointed out that, however desirable it might be to improve the navigation of the Trent, the scheme was being propounded at a time at which the Council could not reasonably look for more money from the Gas Committee. In the depressed state of the market as to residuals, and through other causes, he anticipated that the gas profits would be down next year by from £25,000 to £30,000. Further large and important works of renewals in connection with the existing gas plant were to be undertaken, and money for these must be found from the reserve fund, which could not with safety be further drawn upon. The Council, however, by a considerable majority decided to proceed with the project immediately; the suggestion, in opposition to the idea that the matter was being rushed, being that it would provide much needed work for men thrown out of employment by the war.

In connection with Alderman Ball's protest, it is significant to note, however, that, although the reserve fund in connection with the Nottingham gas undertaking now stands at a respectable sum, it is by no means disproportionate to the capital invested in the concern, the total of which, according to the last available figures, stood at £1,051,391.

Since the meeting of the Council there have not been wanting indications that some of the financial proposals in connection with the scheme are likely to encounter further opposition, and particularly it may be as to drawing upon the gas funds or those of the other trading undertakings. The Corporation are pledged by the terms of their communication to the Development Commissioners to take the necessary steps for obtaining parliamentary authority for the transfer of the rights of the river so far as they extend to the point near Newark; and the proceedings before a Parliamentary Committee may, it is suggested, form the medium for raising the question, not merely in its bearing upon Nottingham, but in a more general way as to the legality of the application of gas funds for such purposes as here suggested. Obviously the Town Clerk himself has not unnaturally some misgivings upon the matter, as the Committee's report discloses that while they had been advised by him that the terms of the gas, water, and tramways powers were "probably" wide enough to enable the Corporation to utilize the profits of these undertakings for the purpose of carrying out the works in question, he felt that the point was of such great importance, and required such careful consideration, that the opinion of Counsel should be taken upon it. So far as the electric lighting profits go, it is clear that they could only be applied in so far as the works are within the city.

It seems a little difficult at present to realize that in principle any other consideration can be extended to the larger and vastly more remunerative trading concerns. The matter is one which appears likely, therefore, to raise some points of legal subtlety. Meanwhile, it has been complained in some quarters that the Council, before committing itself to the scheme, did not take the special advice of Counsel, as recommended by the Town Clerk.

## ROCHDALE PREPAYMENT METER CONSUMERS.

### Engineer Reports against Reduced Prices.

Reference was made in the "JOURNAL" for Aug. 11 [p. 351] to the movement at Rochdale for a reduction in the price of gas charged to prepayment meter consumers, in connection with which it was resolved at a meeting of the Town Council held the preceding week "that the Gas and Electricity Committee be instructed to consider the question of reducing the price charged for gas to slot-meter consumers, and to report thereon to an early meeting of the Council." Prior to this, the Committee had received a letter from the Rochdale Labour Party also requesting them to consider the matter; and the Engineer and Manager (Mr. T. Banbury Ball) was asked to report fully upon it. This he has since done, as follows; and the report was submitted to the Council last Friday.

ENGINEER'S REPORT.

The number of automatic prepayment (usually called "slot") meters within our area of gas supply was 3578, and the income therefrom

amounted to £4426 19s. 7d., or 23s. 7d. per meter, or an average consumption of 7641 cubic feet of gas per annum.

Now the consumer using an ordinary meter and burning a similar quantity of gas for a similar purpose is charged 2s. 4d. net per 1000 cubic feet, or 9d. per 1000 cubic feet less than the slot-meter consumer; and unless it can be shown that under existing conditions in Rochdale this difference is excessive when compared with other consumers, the question really resolves itself into one of the reasonableness or otherwise of the charges to all classes of gas consumers, and not those only who use prepayment meters. Before attempting to show how far this difference of 9d. per 1000 cubic feet is justified, it may be as well to point out that the use of a slot-meter is entirely optional on the part of the consumer. At March 31 last, there were still 12,721 two-light meters under inspection, so that a very large proportion of the smaller consumers use the ordinary type of meter. But the prepayment meter was originally introduced to meet the case of those who were not burning gas on account of the difficulty of meeting the account at the end of the quarter; and it is still a condition of being supplied with a slot-meter that the applicant has not burned gas for a period of at least three months prior to the date of the application. But this type of meter is so popular that in many instances consumers who have been burning gas through an ordinary meter have discontinued its use for a period of three months in order to obtain a slot-meter, though quite aware of the difference in the charge for gas; and these are by no means confined to the poorer class of consumers.

It must be borne in mind that in the case of the consumer using an ordinary meter for supplying gas for lighting purposes (and all slot-meters are so used), the expense of providing the meter, main-tap, and all connections, including their fixing, is borne by the owner of the property supplied. But in the case of the consumer using a slot-meter, the whole expense is borne by the Corporation, and amounts to about 53s. 6d. per consumer; and assuming that 10 per cent. per annum would suffice to cover all charges for interest, wear and tear, and depreciation, we have a charge of 5s. 4d. per consumer. The average consumption being 7641 cubic feet, this represents 8·37d. per 1000 feet out of the 9d. of difference in charge; and this does not include the cost of numerous visits required to remove crooked pennies, metal discs, &c., from the automatic attachment of the meters. Last year these exceeded 500 visits.

In the Council's resolution, eight towns were referred to in which the difference between the ordinary and prepayment rates of charge was much less; but it will be found that in most of these cases ordinary meters are provided and fixed by the authorities themselves, and not, as in Rochdale, by the owner of the property. The additional outlay, therefore, does not warrant a similar difference. It may also be pointed out that, in at least three of the towns referred to, the allocation of profits in aid of rates is limited by Statute; and this may also affect the number of cubic feet allowed per penny.

In view of the additional outlay incurred by the Corporation in supplying slot-meter consumers, there does not appear to be any valid reason why a reduction in price should be made to these in preference to any other class of consumer using a similar quantity of gas for a similar purpose.

---

Mr. WYCHERLEY criticized the report of the Engineer on the minutes of the Gas and Electricity Committee coming up for consideration at the meeting of the Town Council. The report, he said, did not suggest that they desired to encourage the prepayment system. In another town of which he had made inquiries, he found that 42 per cent. of the gas consumed went through slot-meters; and if, as was said here, there was no profit on the system, one would hardly expect a town to develop it in this way. In the place he referred to gas was sold to ordinary consumers at 2s. 1d. per 1000 cubic feet (3d. lower than at Rochdale), and to slot-meter users at 2s. 6d.; and he had it on the authority of the Gas Engineer there that 5½d. per 1000 cubic feet covered the expenditure they were put to on the slot-meters, whereas in Rochdale it was said to cost 9d. The profits in the town he had in mind compared very favourably with Rochdale. He suggested that the Gas Committee should go into the question again, and see if the system could not be worked as well at Rochdale as elsewhere.

Mr. WALKER (the Chairman of the Gas Committee) said the Committee's report was an exhaustive one. Whether they encouraged the slot-meter system or not, it was very popular—and not among the poorest people of the town either. As consumers took the trouble to qualify as slot-meter consumers, the conditions must be such as to induce them to do so. To make a fair comparison of Rochdale with other towns, the whole of the local conditions must be taken into consideration.

The minutes were adopted.

## WIDNES GAS PROFITS AND THE RATES.

At a recent meeting of the Finance Committee of the Widnes Town Council, a resolution was passed—"That the Town Council promote a Bill in the ensuing session of Parliament to amend section 102 of the Widnes Improvement Act, 1867 (Application of Gas-Works Fund), in such manner that the surplus of such fund may, after providing for sinking fund and interest, be carried to the general district fund."

Alderman S. OWEN (the Chairman of the Finance Committee), at a special meeting of the Town Council last Tuesday, said the Gas and Water Committee had decided that, while viewing the resolution sympathetically, they considered the present time inopportune for giving effect to it. In view of this resolution the Finance Committee were desirous that the matter should be withdrawn until June next. The question of using the gas profits for the relief of the rates had been a contentious one for years; but they had to look ahead. The rates were going up, and were likely to be higher still. They compared very favourably with other towns; but if something were not done, they would lose this character. What was proposed was that, so long as gas was sold at 1s. per 1000 cubic feet, and so long as every provision was made for the sinking fund and interest, and the reserve fund of £16,000 built up, then the profits should go to the general district fund. There were certain provisos. One was that should coal become so dear that they could not manufacture gas at 1s. per 1000 cubic feet, then there was to be no surplus given to the rates.

Alderman H. S. TIMMIS (the Chairman of the Gas and Water Committee) said his Committee had very short notice of the Finance Committee's recommendation. It came to them unexpectedly; and one of the reasons why they had asked for its withdrawal was that the matter was of such great importance that it could not possibly be considered at one meeting. He would like to remind the Council that for 22 years the Gas Committee had not charged anything for the lighting of the town; and the cost during this period approached £40,000.

The resolution was withdrawn from the minutes.

## WARRINGTON CORPORATION GAS FINANCES.

### Auditor's Criticisms—The B.C.G.A. Subscription.

Mr. F. Lambert Stevens, the District Auditor, has presented to the Finance Committee of the Warrington Corporation a report on the accounts of the borough in the course of which he refers to the large unappropriated balance on the gas accounts, which he says appears to be more than is necessary for a working balance.

Mr. Stevens further points out that "the charge made for gas supplied to other departments of the Corporation is at the same rate as large consumers, and on street lighting acconnt there appears to have been a profit of £426. There is an item of £64 7s. 6d., paid as a contribution to the funds of the British Commercial Gas Association, which I suggest is unnecessary, as this Association is primarily interested in the advertising of gas as opposed to electricity. . . . In your case the supply of gas and electricity are both in your own hands, and any effective contribution to the funds of the Association in question is calculated to militate against the progress of the electricity undertaking."

Comparing the year under audit with the preceding year, he finds the net profit is £8619, as against £14,448. There was an increase of revenue from the sale of gas of £3174, a decrease of £629 in rentals of meters, and a decrease of £127 from residual products. In the cost of manufacture and distribution of gas there was an increase of £10,109, made up in this way: Coal, £5118; repairs and maintenance of works and plant, £3710; retorts, £356; wages and other expenses of manufacture, £600; and distribution expenses, £325.

---

A long discussion took place in the Town Council regarding this report, which was presented by the Finance Committee along with the report of the Engineer and General Manager (Mr. W. S. Haddock), for the year ended March 31 last.

Mr. OSBORNE (who for some time has been an inveterate critic of the Gas Department) pointed out several respects in which the figures in the two reports varied to some extent. For one thing, the Auditor reported that there was a decrease of £127 from residuals. Both the reports could not be correct. The difference, so far as he had been able to ascertain from a comparison of the two accounts, was in the method of treating stock. The aggregate result might be the same (that was, so far as the profit shown was concerned); but it was obvious that the subsidiary items might show discrepancies. After stating that it seemed wrong to him to take coal into stock at 6s. or 7s. per ton which had cost 11s. 11½d., Mr. Osborne said it would be interesting to know what was the actual value of meters, cookers, and grillers which had cost well over £25,000, and did not appear in the stock at all. It was quite true that £2064, expenditure on prepayment meters, appeared in the balance statement, but he was informed that the statement which appeared in the yearly abstract of accounts did not appear in the same form in the books of the Gas Department. The Auditor had called attention, in the course of his report, to the large unappropriated balance of £33,760 on gas-works account. Eight years ago the General Manager reported that the gasholders showed signs of requiring re-sheeting, and that it would be advisable to establish a renewal fund. Accordingly a sum of £7794 was so set aside. The gasholders, however, had not been re-sheeted, but had been patched. Having ear-marked £7794 for a specific purpose, why was it allowed to be used for another purpose? Repairs to gasholders had been debited to general account, though there was a balance set aside for this purpose. It seemed to him that the large surplus had been used for one object only—viz., to draw on, from time to time, to subsidize the rates.

Alderman TINNION (the Chairman of the Gas Committee), in reply, said that he had no fault to find with Mr. Osborne's attitude, which had been taken up in the proper spirit. He did, however, emphatically object to the assertions or insinuations which had been made by others with reference to the actions of the Committee. Mr. Osborne, in dealing with the differences in the two accounts, had admitted very fairly that in the end the accounts presented were absolutely correct. It all came to what he (Alderman Tinnion) said long ago—that the Gas Committee should no longer be a Committee to bolster-up the rates of the town. It had long been a question of, "How much can we get out of the Gas Committee?" Consequently the Committee had not, to his mind, been working on the best principles. They ought to make the gas cheaply for the consumers and let the Manager have the benefit of manufacturing and selling it cheaply. With regard to the gasholders, money was set aside for renewal, but the profits of the department fell off. The Finance Committee asked for a certain sum for the relief of rates, and the Gas Committee thought they could best spare it from the amount which should have been devoted to the gasholders. While the department made only £8000 profit this year, £11,500 had been given to the relief of rates. So far as he was concerned, an Investigation Committee could be appointed, and Mr. Osborne would be welcomed as a member of it.

Alderman BOLTON said the Gas Committee included the finest commercial men of the town. They could make a profit where others would be bankrupt.

The minutes were approved.

## DANISH GAS COMPANY.

### A Good Year Notwithstanding the Handicap of Coal—The War, the Business, and the German Stations.

The Sixtieth Annual General Meeting was held last Tuesday, at the London Agency, Millbank House, Wood Street, Westminster, S.W.—Sir CORBET WOODALL, D.Sc., in the chair.

The SECRETARY (Mr. H. G. Warren) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

The CHAIRMAN—having mentioned that Mr. R. S. Gardiner (one of the Directors) was not well enough to attend the meeting, owing to an attack of influenza—proposed that the report and accounts be received and adopted. In doing so, he said he thought he might say they both told a story of gratifying prosperity. He would first, and very shortly, deal with the figures of the year's operations, and, before the shareholders parted, would say a word as to the future. After the payment of last year's final dividend and special bonus (in October, 1913), there was a balance to bring forward of £58,077, which was £6764 more than at the same date a year previously. During the year, however, the net receipts had been less by £6972. Thus they had had wherewith to face the dividend claims to June, 1914—the same amount, less only £300, as at June, 1913. The interim dividends on the preference and ordinary shares were paid in March; the latter being increased from 4 to 5 per cent. in accordance with the intimation made and approved at the last meeting. If the recommendation of the Directors now made was accepted, and a further 5 per cent. was divided, with an added bonus of 1 per cent., they would carry forward £61,280, against £58,077 last year. He had spoken before regarding the condition in the Company's contracts with towns in Denmark which (fixing a standard price for gas) provided that it might be varied upward as the cost of coal rose above a standard (also fixed), and must be reduced if the cost of coal fell. By this condition, they were recouped in the account year to a far less extent than in the previous one, although the price of coal was higher—the adjustments not coinciding in time. The loss due to lower gas prices was £4120. An increased sale of 16 million cubic feet of gas (about 1½ per cent.) yielded £1115; and this reduced the net loss on gas revenue to £3005. The Company had been heavily handicapped again in the matter of coal. This, delivered at the works, had cost them more by £4855; while residuals—coke being especially weak—had yielded £4945 less. Further in this category, wages showed a considerable increase. The extras upon expenditure totalled to £16,236, against which had to be set savings or economies amounting to £8890, leaving a net loss, as compared with the previous year, of £7346. On capital account, they had expended £39,744, chiefly upon gasholders and mains. Of the works undertaken, some were not yet completed, and would involve a charge on the current year. The proportion of capital to revenue had again slightly increased, but would take a more healthy direction when the growth of business brought the new plant into profitable use. Further debenture stock to the nominal value of £1540 had been purchased and redeemed. Turning to the finances of the Company, it would be seen that the reserve and redemption account had been strengthened by £28,422, after writing off £1090 from the further depreciation of investments. Of the £263,600 at which this fund now stood, £107,240 was invested—£14,984 in Danish gas shares. These were in addition to the 3500 shares mentioned in the Company's account. The sum of £1493 had been added to the fire insurance account. The item of sundry debtors in the balance-sheet included £17,875 due by the Aalborg Commune for the Tilegarden estate. Litigation with the same commune arising out of the arbitration to determine the value of the Company's undertaking in Aalborg was decided in favour of the Company. The High Court had ordered payment of £2606, with interest. Looked at all round, the record was, in the opinion of the Directors, a good one. Together with Mr. Bidder, he (Sir Corbet) visited Denmark in the spring for the purpose of inspecting the various towns and undertakings. A failure of health somewhat interfered with the efficiency of his service; but his colleague did the work of two, and prepared a valuable report. They were generally pleased with what they saw—especially with the gas and water works, which were in admirable condition. When the extensions now in hand were completed, the Company would be able to meet the increased demand for some years; and the charge upon the gas on account of capital would steadily fall. So far as they were able to judge, all the towns visited were enjoying prosperity. Needless to say, the same story could not be told to-day. The shadow of the war cloud extended far beyond the boundaries of the countries actually engaged in the struggle, and Denmark did not escape. He was informed that commerce and business were suffering throughout the country, and they were seeing evidence of it in falling gas consumption. Although the cost of freight was now less than it was immediately after the outbreak of war, it was still very heavy. Further, it was impossible to reduce expenditure proportionately to a temporary shrinking of revenue; and it was inevitable therefore that the profit of the current year must show a fall. Within the last few days, the Board had received an intimation from Flensburg (which, as the shareholders knew, was in Germany) that the Company's officers there were instructed by the Burgomaster to remit no further moneys to Copenhagen. It was maintained that this was an English Company, and that, although the chief office was in Copenhagen, the benefit of any profits made, whether in Denmark or in Germany, accrued to England. This was a proposition that the Directors had had occasion to dispute before; and they would dispute it again now. The Company had from the first been Danish, registered under Danish law, and had no quotation on the Stock Exchange in London, while its shares were held largely in Denmark. What might be the result of the remonstrance they could not say; but for the time Flensburg must pay its own way, and its surplus cash must stay in Germany. The Company's case would be put before the authorities by Mr. Bong Schmidt, the Company's lawyer, and Mr. Edwards expressed confidence as to the result. The same situation must be met at Ribnitz, with the difference that there were no surplus funds to dispute about there; the station having so far not earned a profit. He might say, it had not made a profit because they had been spending largely in reconstruction of the works, which was not a recurring annual charge, but the Board felt it right to pay these expenses out of income. He had stated the circumstances of the moment quite plainly, as was his duty. It was true that they threatened some encroachment on the full prosperity enjoyed in recent years. At the same time, even if Flensburg profits were lost to the Company for a while, the surplus income would still be sufficient for dividend, provided the Danish towns continued to prosper. The dividend on the year would be the same as last year—viz., 10 per cent., with a bonus of 1 per cent.—as against 10 per cent. and 2 per cent. bonus then. It would be remembered that he made it quite clear at the last meeting that the bonus was occasional only, and not a regular addition to the amount divided. As usual, the dividends would be paid free of income-tax.

Lieut.-Col. DAVIDSON seconded the resolution.

Mr. A. BAIRD said he should like to thank the Chairman on his own behalf and that of the other shareholders, for the extremely interesting statement he had given them respecting the present position of the Company, as well as with regard to the possible prospects. He thought the shareholders had reason to congratulate themselves upon the fact that the Directors had been able to lay before them such a very satisfactory balance-sheet, and upon the further fact that they had felt themselves justified in declaring the same dividend as last year, with the addition of a bonus of 1 per cent., which he (Mr. Baird) thought was an encouraging proof of the confidence of the Board in the continued prosperity of the Company. While they had every reliance as to the ultimate successful issue of the war, no one could tell what its future developments might be, both as regards area of operations, and the effect it might have on the part of the Company's property situated in the enemy's territory. But nevertheless he felt satisfied that the past history of the Company's management inspired the shareholders with every confidence that, whatever might befall, their interests would be carefully safeguarded and protected by Sir Corbet and the other Directors. Perhaps he might be pardoned for referring to one other matter—that was, he had always, as those present might remember, considered that, should any emergency arise in which it might be necessary to fall back upon the invested funds (an emergency had arisen which was a very different one from what he had anticipated), a reserve fund invested outside the business would be a most valuable asset. He scarcely liked to say it, but still he could not help remarking that the only regret he felt was that the amount was not double what it stood at.

The resolution was unanimously passed.

Mr. J. H. BIRCHENOUGH, C.M.G., proposed the declaration of a final dividend for the year ended June 30 last of 2½ per cent. on the preference shares and 5 per cent. on the ordinary shares, and a bonus of 1 per cent. on the ordinary shares, free of income-tax.

Major M. M. BIDDER seconded the motion, which was unanimously carried.

The CHAIRMAN remarked that the next resolution on the *agenda* was one with regard to the remuneration of the Directors. He need not say the Board fully appreciated the kindness of Mr. Clarke in giving notice of this resolution, and, in ordinary circumstances, they might have been prepared to give it silent acquiescence; but, in the circumstances he had mentioned, especially the one which had only just arisen, the Directors thought the time was inappropriate, and so they had asked Mr. Clarke to refrain from making the proposal. He hoped Mr. Clarke would fall in with the suggestion, and that he would not regard this as showing any want of appreciation of the motive which had led him to make his proposal.

Mr. C. B. O. CLARKE observed that, in the circumstances, he would not make the proposition; but he should nevertheless like to say how very thankful the shareholders were for what the Directors had done for the Company. The increase of business was due to their exertions the last few years. He hoped that on a future occasion he should have the pleasure of proposing the resolution.

The CHAIRMAN moved that Mr. J. H. Birchenough be re-elected a Director of the Company. He said he felt it was utterly unnecessary for him to commend with any words this proposition to the shareholders. All he would say was that the Board considered themselves fortunate in having secured Mr. Birchenough as a colleague; and he (the Chairman) hoped he would be long with them.

Mr. F. J. WARING, C.M.G., seconded the proposition, which was cordially agreed to.

Mr. BIRCHENOUGH having responded,

Mr. H. L. G. DAVIDSON proposed that Major E. A. Critchley and Mr. N. E. Waterhouse be re-elected Auditors.

Mr. BERNARD F. HARRIS seconded the motion, which was unanimously carried.

The CHAIRMAN proposed a vote of thanks to the officers. He remarked that the times were trying to everybody; and they were especially so to some of the Company's officers—particularly their chief officer—in Denmark. From Mr. Warren they had unstinted, ungrudging, and very able service; and the same might be said with regard to the staff generally. He mentioned Mr. Edwards more particularly on this occasion, because he had to meet difficult circumstances that arose from day to day, and had hardly the opportunity of telegraphing over for guidance and instructions. Therefore his position was one of unusual responsibility and unusual anxiety. He should like to assure him of their sympathy and support in the position in which he was placed. He therefore proposed that the best thanks of the shareholders be given to the Secretary and Chief Engineer and the officers generally.

Mr. F. D. MARSHALL seconded the motion with much pleasure; and it was carried unanimously.

Mr. CLARKE said he was quite sure the shareholders all wished to thank the Chairman for his conduct of the proceedings, as well as the Board generally for what they had done in the past for the Company. In the troublous times through which they were passing, they had the sympathy of the shareholders; and there was no doubt they would, when the war was over, guide the Company to a return to the full prosperity of the past.

Mr. L. ANDREWS had great pleasure in seconding the resolution. As an old shareholder, and as a man who had visited the Company's

works in Copenhagen and elsewhere, he knew the value of the property. He greatly sympathized with the Directors, knowing that they had difficulties before them which were never anticipated four months ago. The Company was unlike some other European companies in which he had money. Some of these had had the finest half year to June 30 they had ever experienced—such as the Ottoman Railway Company; and yet they were not declaring a dividend. The Directors of the Danish Gas Company had taken a different view of the situation, and were not only paying the dividend, but a bonus. The only regret he had was that he heard the Company were buying up their own shares, and so there was no chance for the shareholders to buy.

The CHAIRMAN said the Board were obliged to the shareholders for their vote. It was surplusage to say that these were anxious times. The Directors felt this keenly; but it did not abate their confidence in the success of the Company. There might be temporary interference, as he had said, with the degree of their prosperity, but this, he did not doubt, would come right before long. He thanked the shareholders for their vote.

## CEARÁ GAS COMPANY, LIMITED.

The Annual General Meeting of this Company was held last Friday, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. F. A. WALLROTH in the chair.

The SECRETARY (Mr. E. Pratt) read the notice convening the meeting and the certificate of the Auditor; and the report and accounts were taken as read.

The CHAIRMAN said that, before moving the adoption of the report and accounts, there was one subject to which he would like to allude. He was sure that all the shareholders must have received with sorrow the announcement of the death of Mr. Thomas Guyatt. He had been connected with the Company for 44 years, during the first 27 of which he acted as Secretary, and the remaining time as a Director. His great knowledge of all the affairs of the Company, and his grasp of the business, rendered his loss a great one. To his family the Board offered the sincerest condolence, and in this he was sure all the shareholders joined. Now, coming to the accounts, and taking first the balance-sheet, the capital showed an increase of £3900, in round figures. This was caused by the Directors having called up the £3 on the second preference shares, making them now fully paid-up, and by the issue of 544 new ordinary shares, on which £2 was paid. Sundry creditors were £650 less; while the reserve fund stood at the same figure. On the credit side, new works amounted to £1210; and he was glad to say chiefly accounted for by new mains and further lamps fixed. The amount due for gas, meter-rental, fittings, &c., was greater by £3500. This was entirely due to the non-payment of the public lighting accounts. Stocks showed a decrease of £2200, goods in transit were £200 less, and cash and bills were £1200 more. Turning to the revenue account, there was an increase of £1630 for gas supplied; but there was a falling off in products and fittings of £1500, chiefly owing to the political unrest in the early part of January, which brought about a change in the presidency. At the beginning of the year (July, 1913), the Company had a very large stock of coal, which they had laid in in consequence of strikes; and they were unfortunate in having cases of spontaneous combustion, by which they lost a large amount. The coal carbonized came to £1490 more—caused partly by this combustion, but also partly by the extra cost that had to be paid. The net result was a profit of £4153, as against £5900; and out of this sum the Directors proposed the payment of dividends as mentioned in the report, carrying forward a balance of £8082, as against £7456. The dividends could not, however, be paid until the Board received the necessary remittances from Ceará. The Company had been very seriously inconvenienced by the arrears in the payment of the public lighting accounts. There was a great deal of political disturbance in the interior of the State of Ceará in the early part of this year, which caused a heavy charge on the resources of the State. Also, owing to the financial stringency in Brazil, trade had been very much depressed. The result had been that the Company had had no public lighting accounts paid since February, and there was now a very large sum owing to them. The European war, which unfortunately broke out at the end of July, had still further hampered the Company; but this did not come in the period embraced by the accounts. He was, however, afraid that the war would greatly increase the cost of their coal during the coming year. There was only one other matter to which he had to refer, and this was that the Directors had filled the vacancy on the Board caused by the death of Mr. Guyatt by the election of Mr. Charles Webb. This gentleman was an old and large shareholder, and it was felt that, with his great business knowledge, he would be an acquisition of strength to the Company. He then moved the adoption of the report and accounts.

Mr. F. W. BROTHERS seconded the resolution.

Mr. W. RICHARDS inquired whether the Directors were expecting to receive payment from the public authorities.

Mr. R. M. LONG asked how much was due on the public lighting account.

The CHAIRMAN replied that the authorities owed for the public lighting since February; and at June there was some £4000 due. They stated that at present they had no money, but held out hopes that something might be paid by the end of the year. No doubt they would get over their difficulties in time. The State depended greatly on export taxes, &c., and had been much affected by the war.

The motion was then unanimously carried.

Proposed by the CHAIRMAN, seconded by Mr. T. M'MAKING, a dividend was declared for the six months to June 30 of 5 per cent. on the preference shares (less income-tax) and of 3 per cent. on the ordinary shares and the paid-up capital of the new ordinary shares (tax free)—making, with the interim dividend already paid, 10 per cent. on the preference shares and 6 per cent. on the ordinary shares for the year. The Chairman again pointed out that the dividend now declared would be paid when they got the money from Ceará.

The CHAIRMAN proposed the re-election as a Director of Mr. F. E. Linging. He said that Mr. Linging had been travelling in Austria, and had been for some time prevented from getting back. Ultimately, however, he reached Genoa, and was to sail for home from there about ten days ago.

Mr. BROTHERS seconded the proposition, which was agreed to.

The appointment as a Director of Mr. Charles Webb was then confirmed, on the motion of the CHAIRMAN, seconded by Mr. LONG; and Mr. A. W. Cooper was subsequently re-elected Auditor.

The CHAIRMAN proposed a vote of thanks to the staff in London and Ceará; remarking that the Secretary worked admirably for the Company, and the Engineer and other officers abroad had had much anxiety through the non-payment of the accounts and the unrest in the State.

Mr. M'MAKIN seconded the vote, which was heartily accorded.

The Chairman and Directors were also heartily thanked on the proposition of Mr. LONG, seconded by Mr. T. A. GUYATT. Mr. Guyatt thanked the Chairman for the kind references made to his father, which he said were much appreciated.

The CHAIRMAN, in acknowledgment, referred to the non-payment of the public lighting account, remarking that the Company had experienced similar trouble before, but things had come out right in the end.

## VERTICAL RETORTS FOR FORFAR.

### Mr. Samuel Milne's Report.

In "Notes from Scotland" in the last number of the "JOURNAL," it was mentioned that the Town Council of Forfar had decided, on the recommendation of Mr. Samuel Milne, the Gas Engineer and Manager of the Aberdeen Corporation, to put up an installation of vertical retorts at the cost of about £9500. The question of improving the plant at the gas-works has been for some time before the Council; a long report having been submitted towards the close of last year by the Gas Manager, Mr. T. W. Harper. Mr. Harper strongly recommended the adoption of vertical retorts on the continuous system, suitable for a make of 250,000 to 300,000 cubic feet of gas per day, with the necessary machinery. This would, he said, suffice for their requirements for a good many years. Early in June last, Mr. Harper reported further on the matter, and directed special attention to the advantages of the vertical system—one of these being that less ground space would be required per ton of coal carbonized. He pointed out that the area occupied by the existing retort-house was 3520 square feet, giving a total make of 240,000 cubic feet of gas per day; whereas the area required for an installation of vertical retorts to make 350,000 cubic feet per day would be only 1650 square feet. As the question of ground space at the works was becoming year by year a vital one, the saving shown was important. A few days later, the Town Council decided to call in Mr. Milne; and it may be of interest to deal more fully with his report than was done last week.

Mr. Milne visited Forfar on the 28th of July, and, in the company of Mr. Harper, made a careful survey of the works and the district supplied from them. He found that the carbonizing plant consisted of five settings of six retorts each, and the maximum make of gas last winter, when the whole of the retorts were in action, was a little more than 248,000 cubic feet per 24 hours, while frequently the daily production exceeded 230,000 cubic feet. The output on one occasion was upwards of 258,000 cubic feet, and frequently exceeded 230,000 cubic feet per 24 hours. The yield of gas per mouthpiece had often been more than 8000 cubic feet, while 7500 cubic feet had been quite usual. This was clear proof that the retorts were working at their utmost capacity during the depth of last winter. There was a gasholder capacity of barely 24 hours' supply, and, in these circumstances, Mr. Milne said there should be a reserve carbonizing plant of not less than 20 per cent. to meet contingencies. There should not, therefore, be the slightest question about the necessity for an extension of the plant, as obviously it was urgent.

Mr. Milne had given careful consideration to the subject of installing new plant, and more particularly to the question of vertical retorts, as he understood that this type of retort had been prominently before the Council for some time. He reported as follows: "I find that an installation of vertical retorts suitable for the requirements of Forfar, and making due allowance for moderate extension, as well as contingencies in working, should be capable of producing 350,000 to 400,000 cubic feet daily—*i.e.*, to meet present requirements, 250,000 cubic feet; to allow of 20 per cent. for contingencies in working, 50,000 cubic feet; and a further allowance of (say) 50,000 to 60,000 cubic feet as a prospective increased output—thus bringing up the total to a possible production of from 70 to 80 million cubic feet per annum. This could be produced by twelve vertical retorts, arranged in units of two, each retort carbonizing about 3 tons daily, or a total of 36 tons per 24 hours. A setting of eight retorts would be sufficient for present winter requirements, and half this number during the summer; so that the proposed installation of twelve retorts would allow 50 per cent. increase on the present daily maximum make." The probable cost of the proposed installation, including foundations, coal breaking and elevating plant, and building enclosure, was put at about £9500.

Mr. Milne considered very carefully the question whether the introduction of vertical retorts would show a monetary advantage over horizontal retorts; and, on an estimated make of 70 million cubic feet of gas per annum—which he thought might reasonably be looked for in a town like Forfar—he found that the savings would allow of the repayment of the capital in 25 years, and of 3½ per cent. interest on the borrowed money from the start. He submitted the following figures in support of this statement: Horizontals, £3706 19s. 3d.; verticals, £2983 16s. 2d.—showing a saving by verticals of £723 3s. 1d. The interest on £9500 at 3½ per cent. represents a sum of £332, while 1-25th of £9500 (allowing 25 years to repay the capital) represents £380, or together £712—an apparent net saving of £11, with, in addition, all the advantages summarized in the report.

Though vertical retorts offered little monetary advantage over horizontals, Mr. Milne said he thought the Council would consider favourably an installation of the former; and therefore he prepared a drawing showing how, in his opinion, it could be put in, having regard to the convenience of the works.

## FUTURE OF LONDON'S ELECTRICITY SUPPLY.

At the Meeting of the London County Council to-day, the Finance Committee will present a long report on the financial aspects of the scheme submitted by a Special Committee for the establishment of a new electricity undertaking for the Metropolitan area, details of which have already appeared in the "JOURNAL." The scheme, it may be remembered, represents a combination of municipal and private enterprise, designed to ensure full control by, and an adequate share of profits to, the public, with the flexibility and commercial enterprise of company management. It is proposed that, in addition to the London County Council, the County Councils of Essex, Kent, Hertford, Middlesex, and Surrey, and the county boroughs of Croydon and East and West Ham, should be represented on the new authority. Subject to the control of this body, the undertaking is to be worked for a term of fifty years by a statutory company, who will share with the authority the provision of the necessary capital. It is contemplated that the undertaking shall gradually centralize the production and unify the distribution of electricity throughout Greater London.

Discussing the financial aspects of the scheme, the Finance Committee point out that an important safeguard to ratepayers lies in the fact that its initiation depends upon the formation of a company of sufficient financial strength to carry it out, and possessing control over an output of electricity large enough to warrant the expenditure of a considerable amount of capital at the risk of the private investor. Further, the co-operation of a company undoubtedly diminishes the financial risk to the ratepayer of carrying on such a business. The operating company, being under obligation to find a substantial proportion of the capital, will have a stake in the undertaking sufficient to ensure vigorous management. The Committee remark that, while it is obvious that there must be an element of financial risk, they are of opinion that "if a company of adequate financial stability is prepared to enter into contract with the new authority for working the undertaking on the general lines laid down, the ratepayers will be as fully protected as is possible in any scheme in which their financial credit is so largely involved. On the other hand, if no such company comes forward, the whole scheme drops, and the ratepayer remains in his present position."

The Committee state that preliminary estimates show favourable results from the first. It is calculated that the capital required for new works will amount to about £5,000,000 for the first five years, and further sums thereafter at the rate of something like £1,000,000 a year. Five years are, however, allowed after the passing of the proposed Act in which to bring the scheme into operation. It is possible, therefore, that if the conditions were temporarily adverse, no heavy expenditure would be incurred till nearly 1920.

## CHARGE AGAINST A GAS COMPANY BY A WATER AUTHORITY.

Judgment was delivered last Tuesday, by Sheriff Shennan, at the Hamilton Sheriff Court, in a case he had heard some days previously, in which the Bothwell and Uddingston Gas Company were charged at the instance of the Middle Ward District Committee with an offence under the Lanarkshire (Middle Ward District) Water Act, 1892. It was complained that on July 4 respondents fraudulently prevented a water-meter at the gas-works from duly registering the quantity of water supplied by the complainers; and this was alleged to have been done by the fixing, without the consent of the complainers, of a branch pipe with a stopcock, which was so situated as to permit of water being taken from the service pipe before the same reached the meter, and to permit of water being delivered therefrom into a fire-clay pipe which again delivered into a well from which the gas-works supply of water for cooling coke and for general purposes was pumped. The Gas Company pleaded not guilty. One of the three witnesses for the prosecution was Mr. James M'Millan (the Water Engineer), who stated that for some time past the supply of water registered by the meter in the gas-works did not seem to correspond with what should be used, when compared with other similar works in the Middle Ward area. The supply to the works through the meter was taken from a 7-inch main. Tests were made, and leakage was discovered. Further investigation led to the discovery of a stopcock connected with a pipe which ran from the service-pipe put in by the water authorities to a well, or rather a hole forming part of an old burn. This stopcock was open, and water was continually running through it into the well. From the Committee's point of view, this stopcock was entirely objectionable; and there was no use for it at all. For the defence, the Chairman of the Company, the Manager (Mr. Lawrence Hislop), and other officials gave evidence. It was stated that the pipe and stopcock complained of had been put in by the late Mr. Balmer (the present Water Engineer's predecessor) in 1903, and was a device (though an unsuccessful one) suggested by Mr. Balmer himself for getting rid of impurities which the Gas Company had complained were injuring their boilers. The pipe was laid by the Water Authority, and the Gas Company had nothing to do with it. They denied that any fraudulent use had been made of it—submitting in proof of this that there was no key in the works to fit the stopcock. If water had been running through the pipe, this had not been due to the respondents, but to the Water Authority, who put in the pipe. The Sheriff, in giving judgment, said he found the charge had not been made out. The loss of water on which the complaint was founded had extended over a number of years; and the prosecution should have been instituted at an earlier date, as the official who was alleged by the respondents to have been responsible for the introduction of certain fittings which were objected to was now dead, and there was no reason why his demise should be made prejudicial to the Gas Company.

The Directors of Meters Limited have declared interim dividends for the half year to Sept. 30 last at the rates per annum of 5½ per cent. on the preference shares and 4 per cent. on the ordinary shares.

## NOTES FROM SCOTLAND.

**From Our Own Correspondents.**

*Saturday.*

The Inspector of Lighting and Cleansing for the City of Edinburgh (Mr. John Gibson) has just presented his report for the twelve months ended the 15th of May last. It shows that in this period there was an addition of 14 high-pressure gas lamps; and in their installation opportunity was taken to demonstrate the possibility of suspending the lamps over the centre of the roadway. At the close of the year there were 10,526 gas-lamps, using 10,613 burners; the electric arc and incandescent lamps bringing up the total to 11,815. Twelve months previously the number of gas-lamps was 10,489, and of electric lamps 1283—together 11,772. The rate charged by the Gas Commissioners was 2s. 3d. per 1000 cubic feet, as before. A report dealing with the subject of the automatic control of street lamps, to which reference was made in the preceding report, has been prepared, and is awaiting the consideration of the Lighting and Cleansing Department. For the lighting of common stairs and passages 14,444 incandescent gas-lights and 1145 electric lights were employed in the case of 6528 stairs in the period covered by the report—being an increase of 60 lights as compared with the year 1912-13. All the stair lights were, as usual, inspected on two separate occasions, when faulty lights were found and reported by the overseers to the number of 2880, occurring on 2174 stairs. Mr. Gibson says these figures afford a pleasing contrast when placed alongside the corresponding particulars furnished a year ago; and all the available evidence goes to show that the stair lights have been receiving much more attention than formerly. Their efficiency, as a whole, may now, he thinks, be regarded as very satisfactory indeed. The value of the lighting plant at the close of the year was £18,450. The revenue from all sources was £296 15s. 6d., compared with £273 10s. 4d. before; and the expenditure was £44,091 3s. 7d., against £44,708 13s. 1d. Deducting the revenue, the net expenditure was £43,794 8s. 1d., against £44,435 2s. 9d., or equal to an assessment of 3½d. in the pound. The net expenditure came to 2s. 8½d. per head of the estimated population (322,363).

At the meeting of the Edinburgh and Leith Gas Commissioners on Monday, Bailie Lindsay submitted memoranda by the Engineer and Manager (Mr. A. Masterton) as to the curtailment of the lighting. In accordance with the recommendations of the Admiralty, lights at the Granton works had been reduced as far as possible, and all those which could be seen from the outside had been shrouded; the glass roofs and windows being painted over so that the reflection might be curtailed to a minimum. The same remark applied to the offices in Waterloo Place and Calton Hill; also to the show-rooms and other district premises. About half of the high-pressure lamps in St. James's Square and the vicinity were being kept dark, and all the high-pressure lamps in front of shop windows in Leith Street had been entirely extinguished. The reduction of lighting throughout the whole of the Commissioners' area of supply was having a marked effect on the consumption of gas; showing a diminution of about 500,000 cubic feet per day.

The Edinburgh and Leith Gas Commissioners have set aside 50 tons of coke for distribution to the necessitous of the two towns at 5s. a ton. The Committee who were to fix the prices of residuals and report have had several meetings, and decided that Messrs. Mackie, Koth, and Co. must implement their contracts to purchase coke and sulphate of ammonia, or claims for damages would be made against them. It was decided not to take any action for effecting a special war risk insurance of the Granton Gas-Works. A novel request has been received from a consumer for abatement of his gas account owing to the great quantity of gas wasted by his employees. Needless to say the Committee did not accede to his request.

There was an unfortunate fatality at the Langholm Gas-Works yesterday week. Henry Cuthbertson, aged 51, one of the night shift, was engaged in investigating, in the valve-pit between the purifiers, the cause of their unsatisfactory working. Accompanied by another man, he crawled into the pit, and it is believed turned a wrong tap in the dark, letting in a large quantity of gas, which almost immediately overpowered him. The man who was with him was also affected seriously, as were two others who tried to pull Cuthbertson out. Two more, one being the Manager, were also nearly overpowered before they rescued Cuthbertson. Restorative measures were at once applied, and medical assistance was speedily secured; but all was of no avail. One of the other men was seriously ill for many hours. Cuthbertson leaves a widow and a large family.

In connection with a proposal to provide improved market facilities for the fruit and vegetable traders in Edinburgh and the district, a number of those interested visited on Wednesday the site of the old gas-works, which it has been suggested might with advantage be transformed for the new market premises. The difficulties have been urged for some time; and the new market scheme has been before the public for a number of years. A Town Council Sub-Committee have been considering the matter, and the old gas-works site was tentatively suggested in a motion by Bailie Rose. The idea of converting the site to the purposes of a new market has found complete favour with some of the traders; and its possibilities were commented upon during the visit of inspection. The party included Mr. A. Masterton, the Engineer and Manager to the Gas Commissioners, to whom the property belongs, and Mr. Williamson, the City Architect. The site is 4½ acres in extent, and it was pointed out that it occupies a good central situation, and offers excellent railway facilities.

At a meeting of the Kirkcudbright Town Council last Wednesday, the Water Committee reported that they had had under consideration the report of Mr. D. A. Donald, of Grangemouth, on the proposed new water supply for the burgh. After full discussion on the various schemes suggested, the Committee resolved to recommend the adoption of the Loch Whinyeon scheme, and to approach the proprietors of the loch and the land between it and the public road at Glengap, to ascertain whether they will grant to the Council the right to take water from the loch and wayleave for the pipes, and on what terms. After this information is received, Mr. Donald will be asked to meet the Council and discuss further proceedings. It is estimated that the scheme will cost about £7000. The report was adopted.

## CURRENT SALES OF GAS PRODUCTS.

### The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 2.

During the past week the market for tar products has remained almost without change. Pitch is firmly held by London makers, whose minimum price is 34s. net per ton. It would appear, however, that two or three transactions have taken place in the West Country at lower prices; but it is hoped that the position will be steadied, and a proper price ultimately obtained. There is a movement on foot to provide for co-operation between the tar producers and tar distillers in dealing with the present pitch situation, with a view to prevent forced sales and a needless break in price. It is hoped that a mutual scheme for carrying in stock that part of the make of pitch, which cannot now be shipped to some markets owing to the war, may be adopted. It is reported that crude carbolic acid has been sold at 2s. 6d. net per gallon, casks free, and 90 per cent. toluol at 1s. 6d. to 1s. 7½d. net and naked. Creosote remains firm at 4⅛d. net in bulk.

The position of sulphate of ammonia is still quiet, and makers maintain their price at £10 17s. 6d. net per ton filled into buyers' bags at makers' works for 25 per cent. quality.

### Tar Products in the Provinces.

*Nov.* 2.

There is no material alteration in the market for tar products; but several articles remain very firm. Ninety per cent. benzol is quiet, and there is little business doing. Toluol is exceedingly firm, and shows signs of further improvement. Solvent naphtha is quiet, and there is a fair amount offering at lower figures. Heavy naphtha is steady and prices are maintained. Creosote is firm, and good prices are reported to have been paid. Crude carbolic is also fairly firm, and improved prices have been paid.

The average values during the past week were: Value of liquid products in one ton of tar, 15s. 9d. to17s. 3d. Benzol, 90 per cent., naked, North, 9d. to 9½d.; 50-90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 1s. 8d. to 1s. 9d. Crude naphtha, in bulk, North, 5½d. to 5¾d. Solvent naphtha, naked, North, 8½d. to 9d. Heavy naphtha, naked, North, 11d. to 1s. Creosote, in bulk, North, 3⅜d. to 3 7/16d. Heavy oils, in bulk, 4d. to 4½d. Carbolic acid, casks included, 60 per cent., East and West Coasts, 2s. 5d. to 2s. 6d. Naphthalene, £4 10s. to £10; salts, 55s. to 60s., bags included. Anthracene, "A" quality, 1⅝d. to 2d.; "B" nominally ¾d.

LIVERPOOL, *Oct.* 31.

### Sulphate of Ammonia.

Throughout the week the market for this material has continued without animation, and, although no quotable change in values has taken place, the volume of actual business has only been small. Manufacturers have not been pressing sales, and buyers have been indifferent about purchasing at the present level—viz., £10 16s. 3d. per ton f.o.b. Hull, £10 17s. 6d. f.o.b. Liverpool, and £11 f.o.b. Leith. Producers have still required a substantial premium for delivery over the early months of next year, but it has not transpired that they have succeeded in making further contracts.

### Nitrate of Soda.

The tone of this market is quiet but steady, and holders on spot repeat quotations at 10s. per cwt. for ordinary, and 10s. 6d. for refined quality.

### Sulphate of Ammonia.

From another source it is reported that the market for this article has again gone somewhat quieter, and in many quarters transactions are reported at lower prices. Outside London, makes are quoted at £10 to £10 2s. 6d.; Hull, £10 15s.; Liverpool, £10 17s. 6d.; Leith, £10 17s. 6d. to £11; Middlesbrough, £10 15s. to £10 17s. 6d.

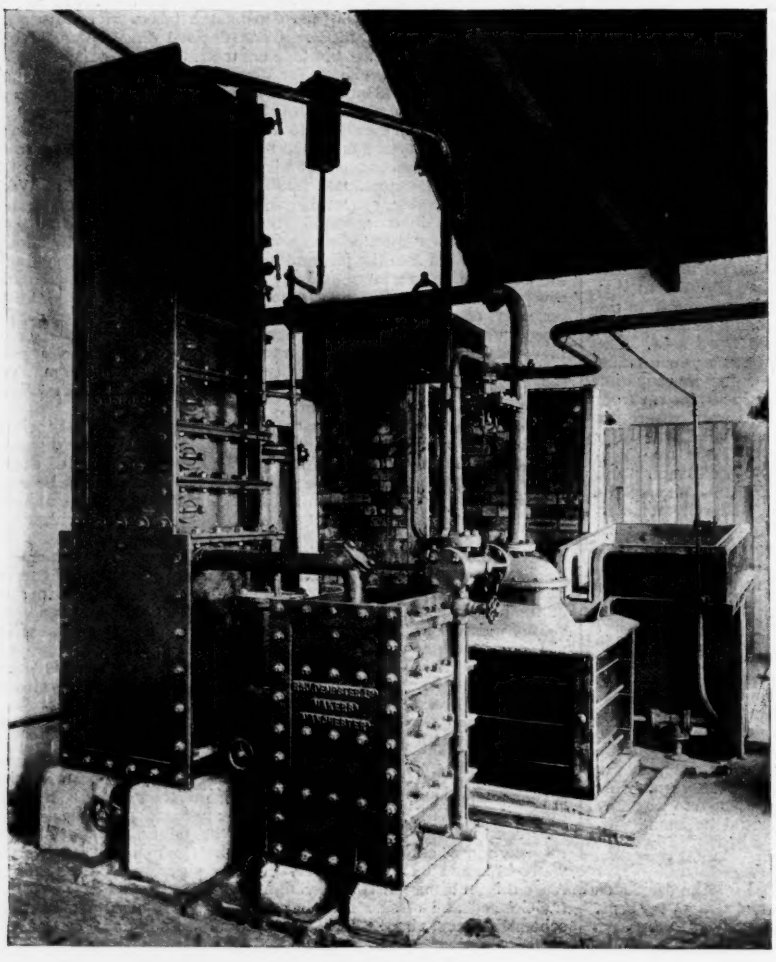
## COAL TRADE REPORT.

### Northern Coal Trade.

There is a slight improvement in the demand for coal; but the market is much influenced by the high rates that are quoted for sea freight. In the steam coal trade, the exports are moderate. Best Northumbrians are from 13s. 1½d. to 13s. 3d. per ton f.o.b.; while for second-class steams the inquiry is a little fuller, and 11s. 3d. per ton is the current quotation. Steam smalls are rather quiet, and vary from 7s. 6d. to 9s. 3d. per ton, according to the quality and time of delivery. In the gas coal trade, there is the increase in the demand which is usual when November is entered upon; but freights such as 11s. 9d. to 12s., Tyne to Genoa, have the effect of lessening exports to some of the Mediterranean centres. Best Durhams are steady at 12s. 6d. per ton f.o.b.; second-class gas coals are near 11s. 3d. per ton; and "Wear Specials" are steady at 12s. 6d. to 12s. 9d. per ton. The former of these prices is believed to be the figure at which a Swedish contract for prompt delivery was fixed a few days ago. Some inquiries are being made for cargoes for French ports; and the deliveries on contracts for the South of England proceed steadily, sometimes by steamers that are above the average size. Coke seems a little steadier. Gas coke is plentiful at 11s 9d. to 12s. 6d. per ton f.o.b. in the Tyne, according to conditions.

### Effect of the War on the Gas-Coal Trade.

A correspondent writes: The war has had a very considerable effect on the gas-coal trade in this country, both directly and indirectly. In the ordinary way, a large tonnage of gas-fuels is exported to countries on the Continent; and though there is still a certain amount of business passing through the East coast ports, to neutral and friendly countries, it is far less than usual at this period of the year. At the moment a



SULPHATE OF AMMONIA PLANTS.

ONLY ONE TYPE,

"THE BEST."

ENQUIRIES SOLICITED BY

R. & J. DEMPSTER, LD.,

GAS PLANT WORKS,

MANCHESTER.

Telephones: 54 and 2296 CENTRAL.

heavy tonnage is going to the French ports. No doubt, to an extent, this is to take the place of supplies usually drawn from their own coal-fields, where pits have stopped working owing to the war. There is about the usual tonnage being cleared through the West Coast ports. In this country, possibly the districts most affected indirectly by the war are the cotton and lace manufacturing areas. Many of the mills engaged in these trades are working short time; and as they are large consumers, it will readily be seen how local concerns will find their sales of gas very substantially reduced. The public generally are, no doubt, economizing in the use of gas for cooking and heating, far more than in normal times—which will also have some effect on consumption. Indeed, in the aggregate, the figures on this account alone would possibly be enormous. It is understood that in some instances gas-works concerns have found their sales reduced to such an extent that they have been compelled to notify collieries that at present they will be unable to accept full deliveries on account of contracts.

## Bristol Out-Districts and the Price of Gas.

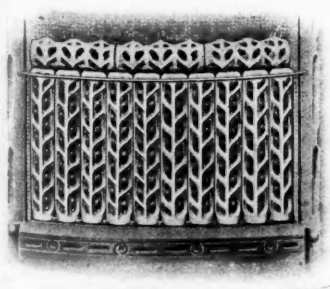
The recent action of the Bristol Gas Company [*ante*, p. 205] in raising by 2d. per 1000 cubic feet the price of gas supplied by them in certain Gloucestershire parishes, was referred to at last week's meeting of the Gloucestershire County Council. The Chairman (Mr. M. W. Colchester-Wemyss) remarked that, in the revision of the county rate, among other industries affected was the Bristol Gas Company. He thought they were justified in making some alteration, because the Company were rated in the county on the poor-rate at £220; and after a certain amount of argument, by mutual consent they agreed to go up to £720. The Company did make a threat, while the discussion was going on, that if the Council increased their assessment they would increase the price of gas within the county. Naturally, the Council disregarded this threat, which had nothing to do with the question of whether or not they were fairly rated. This higher figure of £720, as he had said, was agreed upon. Now they were informed that the Company had put their threat into operation, and so far as the county was concerned—not in the City of Bristol—they had increased the price of gas. He thought that, in these circumstances, if the districts affected wished for the assistance of the County Council in appealing against this, they should render it to the extent of their capacity. He suggested that the County Rate Committee should be authorized to take such steps as they might think fit to support any action taken by the districts against the Gas Company. This was agreed to. Subsequently, at a meeting of the Mangotsfield Parochial Committee (whose area is affected by the Gas Company's action), a resolution was passed—"That this Committee must strongly deprecate the action of the Bristol Gas Company in raising the price by 2d. per 1000 feet in the districts of the Gloucestershire county, as a retaliatory measure upon their increased assessment; and that the local representatives of the County Council be asked to use their influence, and take the necessary steps, to get the matter adjusted."

## Rugeley Gas Company and the Supply of Colwich.

Early last month a deputation was appointed at a meeting held at Colwich to wait upon the Directors of the Rugeley Gas Company in regard to a supply of gas for the parish; and at the meeting of the Parish Council on Monday last week they presented their report. Questions were put to the Directors on two points. The first was as to the terms on which the Company would supply gas to Colwich parish (which includes Great and Little Haywood and Bishton); and the reply was that they were ready to supply gas on condition that a million cubic feet were taken yearly, the price to be 3s. 10d. per 1000 feet. The second point was the terms on which the Company would withdraw their opposition to the Stafford Corporation supplying gas to Colwich. The reply was that they would do so on payment of £2200; but the Directors were willing to refer the amount to arbitration. The Chairman of the Council (Mr. E. Thomas) characterized the demand as an extraordinary one. Mr. Morgan said he had seen the Chairman of the Stafford Corporation Gas Committee, who were ready to supply gas at 3s. 6d. per 1000 cubic feet (as against Rugeley's 3s. 10d.), with 2½ per cent. discount on quarterly accounts. It was decided that the Clerk should write to the Local Government Board explaining the circumstances, and "protesting in the strongest terms against the selfish policy of the Rugeley Gas Company." Mr. Graham Balfour said it was monstrous that a commercial company in Rugeley should try to get £2000 from the Stafford Gas Committee for supplying Colwich with gas and water. Such a position was quite untenable. He also urged that a similar letter be forwarded to the Clerk of the County Council of Staffordshire. Mr. Morgan added that at the recent interview the deputation were informed that it cost the Rugeley Company £1000 to obtain their Order, which included Colwich and three other parishes. He therefore failed to see how Rugeley could hope to obtain £2000 for relinquishing their right to supply Colwich, because £500 might fairly be allocated to Rugeley, which was the main source of supply, and the balance divided between the other four parishes. The Rugeley Company said they must have regard to the profits they would make if they supplied Colwich with gas; but he thought these were very problematical. He should say the £100 offered by Stafford was about the right figure.

**Bland Light Syndicate, Limited.**—At the sixth annual meeting of the shareholders of this Company, held at the registered offices, No. 29, Little Trinity Lane, on the 23rd ult., the Chairman (Mr. F. J. Gould) announced that, so far as the Directors were able to foresee, they were not of opinion that the Company would be adversely affected by the war, though he felt sure the Board would have the support of the shareholders in adopting a conservative policy and husbanding the resources of the business. An interim dividend at the rate of 6 per cent. per annum for the six months ended Oct. 31, 1913, was paid last March; and it was decided to make a further distribution at the rate of 10 per cent., making a dividend of 8 per cent. for the year.


The "THERMO-X" Firefront.

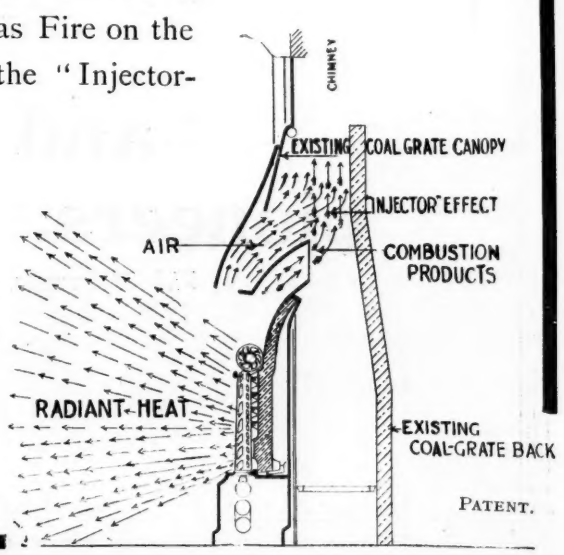


# TWO CREATIVE INVENTIONS.

No one would use a Gas Fire to-day unless it had a firefront on the "THERMO-X" principle.

To get the same comfort with a Gas Fire as with a Coal Fire it is indispensable to have a Gas Fire on the "Thermo-X" principle, and embodying the "Injector-Ventilating" principle.

The vital importance of the Ventilation question to Gas-fire progress cannot be exaggerated. This "Injector-Ventilating" Invention is going to drive it home to all concerned.




**JOHN WRIGHT & CO., EUREKA WORKS, BIRMINGHAM.**

## A Broken Electric Light Agreement.

Another stage in the controversy over the scheme for providing electric lighting at Torpoint was reached last week, when the award was given in the arbitration between the District Council and the Torpoint Electric Supply Company, Limited. The question in dispute had reference to the terms of an agreement which was entered into between the Council and the Company in April. Two clauses of the agreement provided that the Company should submit plans to the Council, and that if the light were not supplied by Sept. 30 the agreement should be at an end, and the Company should pay the Council £100 as damages. After the agreement was entered into, some difficulty arose in connection with the formation of the Company, and the promoters notified the Council on May 30 that it would not be formed. This notice was afterwards withdrawn; and though the Council were of opinion that the contract was determined, it was renewed on July 2. Plans had been deposited with the Council on June 10; and on July 21 the Council disapproved of them. It was contended, on behalf of the Company, that the Council had acted contrary to the agreement in delaying their decision on the plans; and that as disapproval was not expressed within one month from the time they were deposited, the Council had forfeited the right to reject them. The case for the Council was that, as there was no agreement in existence on June 10, there could be no valid deposit of plans at that time, nor until the agreement was renewed on July 2. It was also argued that, as Dr. J. A. Samuel, a Director of the Company, is a member of the Council, and was present at the meeting on July 2, there was through him a communication to the Company within the prescribed month. The Arbitrator was Mr. H. L. Murphy (Barrister-at-Law); and he has decided against the Company on all the points submitted to him, and ordered them to pay the costs of the arbitration. The decision involves the payment of the £100 damages by the Company.

**The Suggested Suspension of Municipal Sinking Funds.**—The Lancaster Town Council, on the recommendation of the Finance Committee, have adopted a resolution urging the Government to sanction for one year the suspension of the sinking funds provided for the repayment of municipal loans. Sir N. Helme, M.P., while agreeing with the principle of the resolution, pointed out that it was premature, because the Association of Municipal Corporations had not yet come to a decision on the matter.

**The Sale of the Dudley Electricity Works.**—Figures as to the transfer of the Dudley Corporation electrical undertaking to the Shropshire, Worcestershire, and Staffordshire Electric Power Company are contained in a report prepared by the Borough Treasurer (Mr. A. W. Harley). The capital expenditure was £106,183, of which £102,222 was out of loans and £3960 out of revenue. The loan repayments amounted to £37,587, and the sum met out of revenue was £3960. Contributions from the general district rate were £2000, and there was a net deficiency at the date of transfer of £10,226.

## Southend Corporation and the Leigh Gas-Works.

A Local Government Board inquiry (at which there was no opposition) was held by Mr. H. R. Hooper, at Southend, with reference to an application by the Town Council to borrow £3340 for the erection of further retorts, and a building to accommodate them, on land adjoining the Leigh-on-Sea Gas-Works. The Town Clerk (Mr. H. J. Worwood) pointed out that the Corporation proposed to apply for a Provisional Order extending the limits of supply of their gas undertaking so as to include a part of the borough not within the limits of supply of the Gas Company, and also a portion of the parish of Eastwood. He added that the undertaking was a rapidly growing one; the average yearly increase in the output of gas being 6 million cubic feet. Referring to the inquiry, the "Southend Observer" says: "For years Leigh people have exercised their minds about the gas-works. The whole town knows that there has long been an agitation for the removal of the works to a position where they would be less offensive to the sight of folk who live on the adjacent heights; while others say that as long as the works remain where they are, Leigh will not have a parade. These two points of view have provided the Leigh Ratepayers' Association with fruitful topics for discussion, and have formed the subject of many a resolution. A Local Government Board inquiry has been held at Southend with reference to the Town Council's application for sanction to a loan for the enlargement of the works by building retorts on land adjoining the present site; yet nobody turned up to oppose. When such things happen, people may be pardoned for not attaching quite so much importance to views advanced at meetings of Ratepayers' Associations as do the folk who give vent to these views."

**Gas Supply in Southport and Widnes.**—Attention has been called to the fact that an error crept into the extract from Mr. Isaac Carr's letter to a local paper, on Widnes and Southport gas affairs, which was reproduced in last week's "JOURNAL" [p. 201]. In the eighth line from the end, it was stated that the cost of manufacture at the works (without capital or distribution charges) was: Southport, 10s. 9d.; Widnes, 4s. 9d. per 1000 cubic feet. The figures, of course, should have been 10·9d. and 4·9d. respectively.

**Louth Gas Company.**—The annual meeting of the Company was held last week, when it was reported that the net profits for the year were £2738. The balance standing to the credit of the profit and loss account was £3499, out of which the following dividends will be paid: On the original capital at the rate of 15¾ per cent., on the improvement stocks "A" and "B" at the rate of 5 per cent., and on the new ordinary stock (1877) at the rate of 12¾ per cent. This will leave a balance of £1367, out of which £500 goes to the contingent fund. There has been a slight increase in the consumption of gas. The dividends are at the statutory rates; those on the original and new ordinary shares being at an increased rate of 5s., in consequence of a reduction of 2d. per 1000 cubic feet in the price of gas during the past year.

"That goodly hygienic thing——the Gas Fire."

*Vide* "THE TIMES," 22nd June, 1914.

——and we are the pioneers.

*Vide* "JOURNAL OF GAS LIGHTING," 30th July, 1912.

THE DAVIS GAS STOVE CO., LTD.,
60, OXFORD STREET, LONDON.

### Municipal Competition with Private Undertakings in the United States.

We learn from a communication received from the Public Service Commission of the Second Division of the State of New York that they have granted the application of the village of Bath for authority to supply electric current to the public from a municipal plant, as well as to furnish current for street lights and other municipal purposes. The application was opposed by the Bath Electric and Gas Light Company, who at present furnish current to private consumers in Bath; and in the opinion of Mr. W. T. Emmet, the Commissioner who heard the case, the question of permitting municipal competition with a private and previously established concern is discussed at some length. He finds that in this case the competition is justified because the Company have not for a long time been able to give proper service at satisfactory rates; and while his opinion seems to show that the granting of the present application may mean the wiping-out of the Company, he finds no other alternative, and expresses the view that it would be fair for the municipality to buy-out the plant of the private concern. As a result of the service supplied by the Company, frequently complained of to the Public Service Commission, the municipal authority recently refused to renew its contract for street lighting with the Company, and began the erection of plant to supply current for the purpose. Mr. Emmet points out that the village had a perfect right to do this under the law, and that it has fulfilled the law in its various steps. The authority of the Commission is only needed when the plant does other than municipal business. He finds there is not business in Bath for the successful operation of two electric plants.

**Morley Gas and Water Supply.**—The accounts of the Morley Corporation Gas Department for the year ended March 31 last show a surplus of £351, after making a transfer to the district rate. The income was £21,547, and the expenditure £21,196. The contribution to district rate was £500. The accounts of the Water Department show a surplus for the year of £682, after payments to the sinking fund and transfer to the rates.

**Stockport and the Education of Gas-Fitters.**—At the last meeting of the Stockport Gas Committee, the Engineer (Mr. S. Meunier) reported that a special class for gas-fitters and improvers had been commenced at the Royal Technical Institute, Salford, and that several of the gas-works employees were attending. It was resolved by the Committee to pay the fees of the students, and to pay their rail and car fares, provided they make 80 per cent. of possible attendances. At the same meeting the Engineer reported that tenders had been obtained from local plumbers for fixing fires; and he recommended that, in view of the fact that different towns had different arrangements, and that the question was being considered by the Institution of Gas Engineers, the matter should be referred to a Special Sub-Committee for consideration and report.

### Profit-Sharing at Chester.

In presenting to the profit-sharing employees of the Chester Gas Company the report for the year ended June 30 last, the Committee stated that from many points of view the year had been the most successful one since the inauguration of the scheme. The number of employees benefiting was 103, as compared with 65 in 1901, when profit-sharing was introduced. The amount of stock purchased by employees was much larger than in any previous year; being £340 of stock, costing £382 10s. The withdrawals which were not occasioned by employees leaving the Company's service had been generally made for advantageous purposes, and for the relief of sickness. Employees had now purchased under the profit-sharing scheme the aggregate amount of £1850 of the Company's ordinary stock, in addition to which the accounts showed balances standing to their credit amounting to £1274. The Committee had had under consideration the effect which the war might have on the finances of the Company, and the interests of profit-sharing employees therein; and they unanimously recommended that the agreements for the coming year should be signed with the following proviso: "That regardless of anything in the profit-sharing scheme and rules to the contrary, the declaration or payment of any bonus according to scale in whole or in part in respect of the year ending June 30, 1915, be left in the discretion of the Directors." Alderman J. M. Frost, J.P. (the Chairman of the Company), presided at the meeting of profit-sharing employees at which this report was adopted, and said he had not the slightest fear that the Board would feel any necessity to take advantage of the freedom of action which the suggestion of the Committee would give them. The Directors were, however, delighted at the confidence shown by this determination to leave the operation of the scheme during the coming season to the discretion of the Board.

**The Berlin Undertaking of the Imperial Continental Gas Association.**—The "Financial News" yesterday contained the following statement received from Amsterdam through Reuter's Agency: "The German Press has embarked with fervour on a new campaign of reprisals against the Allies. The big British companies, especially, enjoy the newspapers' attention. The 'Vossische Zeitung,' in a burst of local patriotism, attacks the Imperial Continental Gas Association and the Municipality of Berlin. The Company was founded in 1825 by Special Charter of the Minister of the Interior and Police to introduce gaslight in the streets of Berlin. This Charter has been renewed three times since, and will expire on April 21, 1915. The shareholders are mostly English. The Charter gives the Company the right of extending its contract beyond the fixed time; and this privilege has been confirmed by a decision of the Courts about sixty years ago. The 'Vossische' now demands that the Government should not respect this 'scrap of paper,' and should stop with an energetic hand this exploitation of German conscientiousness."


# THE SUN—AND THE "SOLA" GAS FIRES.

If any tradesman were able to announce that he was in a position to supply the **SUN** in segments, designed to meet the needs of domestic heating, what a rush of orders he would receive.

Why? Simply because its heat is healthful, radiant energy. How far short of perfection it would fall, however, if it were not also silent.

The idea of parcelling out the Sun is a pretty one for dreamers, but the practical man takes things as they stand, and acts accordingly. For that reason we respectfully bespeak your attention to the latest merits of the **"SOLA"** series of **GAS FIRES**

Their superior radiation qualities are already undisputed. To this essential we are now able, after unremitting research and experiments, to add the unique feature of being

## SILENT UNDER ALL CONDITIONS.

In ascribing to this series of Gas Fires "The silent heat of the Sun," therefore, we indulge in no vain musing, but accomplished fact. The possibilities in the way of increased gas output and highly satisfied consumers will at once appeal to you.

Full descriptive matter and illustrations in the latest "Sola" pamphlet, free on application to the Manufacturers and Patentees,

**WILSONS & MATHIESONS, LTD.,** Carlton Works, ARMLEY, LEEDS.

London Showrooms:—76, Queen Street, Cheapside, E.C.

## Gas-Cookers in London Hospitals.

The Metropolitan Asylums Board, at their meeting last Saturday, had a report presented from the Hospitals Committee, dealing with the advantages of the installation of gas cooking-stoves. It stated that the Medical Superintendent of Grove Hospital had suggested that economy might be effected by substituting gas-stoves for the existing coal-ranges in the ward kitchens at the hospital, and by the provision of a small gas-stove in each of the kitchens of the seven isolation blocks. The Engineer-in-Chief approved of the suggestion, and recommended, in addition, that gas-stoves be installed in the kitchens of the nurses' homes and the male staff quarters, that gas-meters be provided in each of the blocks, and that a main-meter be installed to control the whole supply. The Engineer estimated that these suggestions, if carried out, would effect a saving of £120 per annum. Offers had been obtained for the provision and fixing of the gas-stoves, &c., and the lowest, which he recommended should be accepted, amounted to £129 17s. 9d. The Board agreed to the installation of the gas-stoves and the other alterations suggested, and referred them to the Works Committee to carry out.

**Stoke-on-Trent Electricity "Concern."**—At a meeting last week of the Stoke-on-Trent Federated Council authority was given for the Electricity Committee to apply to the Local Government Board for sanction to borrow £30,000 to cover overdrafts and anticipated works on capital account. The Chairman of the Finance Committee (Alderman F. Geen) said he viewed with concern the large amount of money required by the Electricity Committee, and hoped they would be careful in their recommendations for capital account expenditure. The Committee's overdrafts at the bank had been very large indeed; and if, as was the case, their profits were insufficient to meet the loan charges, he did not see how they could hope to reduce the overdrafts. Mr. Coates agreed, and said that as the Electricity Committee had a quarter-of-a-million of public money locked up in the undertaking, it behoved them to be very careful as to future expenditure.

**Barrow-in-Furness Gas-Works Contracts.**—At the last meeting of the Barrow Town Council, Alderman Neal proposed that the tenders for the works in connection with the new gas-works at Salthouse should be referred back to a meeting of the General Purposes Committee to be held on an early day. Mr. Wake, however, protested against the matter going before the General Purposes Committee. He did so because at the Electricity Committee meeting the same day, the Chairman of the Finance Committee induced them to send a special expenditure also to the General Purposes Committee. He protested against the work of committees being taken for review to the General Purposes Committee. It was playing fast and loose with procedure, and meant that the Chairman of the Finance Committee was to be the dictator over every other committee of the Council. The minutes were approved, including the letting of tenders to the extent of £11,000.

## Middleton Corporation Electricity Losses.

Referring to the losses incurred in connection with the Middleton Corporation Electricity Department, the minutes of the Electricity Committee confirmed at the last meeting contained a resolution that the Council be recommended to make application to the Local Government Board for sanction to the discharge of the accumulated debit balance of £1815 accrued in connection with the electricity undertaking by six equal quarterly instalments, commencing April 1, 1915. Mr. Monk (who moved that the minute be referred back) said for many years the electricity undertaking had been a losing concern, and under the existing conditions would continue to be run at a loss. He thought the whole thing ought to be put under fresh management. Mr. W. M. Wiggins (the Chairman of the Electricity Committee) replied that the electricity works were now a paying concern, and were being run more economically than a few years ago. They had had to pay a large sum of money to the sinking fund; and when the whole of this expense was wiped off, they would find the undertaking was not such a white elephant as it was made out to be.

**Explosion Caused by Fractured Gas-Main.**—Considerable damage was done to a house in Church Street, Liskeard, by an explosion of gas which appears to have resulted from a fractured gas-pipe in the adjoining street. Three persons were in the house at the time, and one of them, a Mrs. Jones, was in the act of lifting the kettle from the fire when the explosion occurred. The woman was thrown violently to the ground and struck by the door of the room which was wrenched from its hinges and fell on her. The furniture in the house and the walls and ceilings were greatly damaged. No gas is used in the house; but on examination by representatives of the Liskeard Gas Company it was found that there had been an accumulation of gas in an old drain which runs underneath the roadway, and that this had passed into a cavity under the house. The gas had escaped from a service-pipe which had been fractured during the rolling of the street shortly before the explosion.

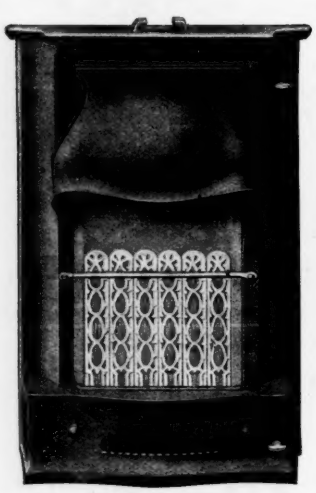
**The New Buersil (Rochdale) Water-Works.**—At the last meeting of the Rochdale Water Committee, a statement was made as to the cost of the Buersil service, which has recently been completed. This showed a total expenditure of nearly £25,000 (including the cost of the site), against an original estimate of £18,500. From the total outlay there will be deductions for plant and material which has to be sold; but the revenue from this source will not be large. The construction of the reservoir has taken from the autumn of 1910; but before then one firm after another withdrew their tenders. In June, 1911, questions arose with the Contractor who finally secured the contract, as to his obligations and the possibility of making a water-tight bottom to the reservoir. The contract was terminated, and the remainder of the work carried out by the Water Manager (Mr. F. H. Brunt), under the Consulting Engineer (Mr. H. Rofe). They have reported to the Committee that a satisfactory completion of the work has been made.


# PARKINSON'S

## New Productions.

PS

### THE "CONGREVE."



Similar to our well-known Ratclift and Edmund Fires, but fitted with boiling burner in top if required.

The Special Fender encases all brasswork, while the "Intense" Pillar Fuel possesses remarkable radiating power.

The specially constructed burner ensures **absolute silence.**

**Price, 8½" Fire Opening, 26/6 with top Boiling Burner.**

**THE PARKINSON STOVE Co., Ltd.,**

**BIRMINGHAM AND LONDON.**

## GAS COMPANIES IN THE STOCK EXCHANGE.

Practically little, if anything, was done last week on the lines of approach towards the re-opening of the Stock Exchange. The feeling gained ground that the step was a great deal too risky to be adventured upon yet awhile, and that it would be far more wise and prudent to continue existing conditions, which had been tried and proved by weeks of experience, rather than to hazard, perhaps prematurely, a step which to a great extent must remain a leap in the dark until taken, and which might then prove disastrous. Attention was chiefly directed towards the assistance to be afforded by the Government in respect of Stock Exchange loans, and to the approaching settlement fixed for mid-November. As to the latter, there are misgivings in some quarters; but this, of course, is only to be expected—so much depends upon the point of view. Business in Stock Exchange securities in the open market has continued to be of the quietest character, and devoid of any marked characteristic. At times the tone was cheerful, and at times dull, and prices thus actuated moved gently backwards and forwards. In the Money Market, gold keeps flowing steadily in, and the position is very easy. Short loans were obtained at under 2 per cent.

Bank rate (fixed Aug. 8), 5 per cent.; last year, 5 per cent.

[*Erratum.*—In last week's article, for "best rates" (line 20) read "last rates."]

**Staveley Gas Company.**—At an extraordinary meeting of the Company last Friday, resolutions were unanimously passed approving of application being made for a Board of Trade Provisional Order, and of an increase in the nominal capital from £11,000 to £16,000. The Chairman (Mr. F. Hardwick) explained that the Directors proposed, on the request of a large number of the residents of Barlborough, to extend the services to this district, for which purpose it was necessary to apply for an additional Provisional Order.

**Retford Gas and Water Undertakings.**—According to the last annual report on the Retford Corporation gas undertaking, the revenue amounted to £9545. being an increase of £108. The gross profit was £2421, compared with £3123, and the net profit £1046, against £1773. The Gas Committee recommend that £500 of the accumulated profits should be used in relief of the general district rate. The revenue from the supply of water was £3265, compared with £3250; and the working expenses and charges against revenue came to £1926, against £1549. The net profit was £819—a decrease of £427. The water undertaking cost £30,101; and the whole has been repaid except the £328 on the loan account.

**Electric Light Failure at Todmorden.**—Last Wednesday evening the Corporation electricity supply failed in the Halifax and Burnley Roads, Todmorden, at about 7.30. Several shops were affected; and candles had to be requisitioned for the remainder of the evening. During the night the defect responsible for the failure was remedied; but on the following evening there was a similar occurrence.

**Overcome by Gas.**—Two fitters in the employ of the Gas Light and Coke Company were twice overcome by gas within a quarter of an hour last Friday afternoon, They were engaged in clearing out a pipe at the Sports and General Press Agency office in Essex Street, Strand, when escaping fumes from a disconnected pipe overcame them. Two policemen who were called to the premises rescued them and brought them round, and as soon as they had recovered they returned to connect the pipes and thus stop the escaping gas. This time they were so badly overcome that they had to be removed to Charing Cross Hospital, where they were detained. Meanwhile a telephone message had been sent to the Company's offices, and an inspector (Mr. E. Pilbrow) appeared on the scene and entered the gas-laden apartment. With some difficulty he managed to connect the pipes and stop the escape; but at the conclusion of his labours he himself became unconscious, and was rescued by the police.

The Welsbach Light Company, Limited, send a copy of a neat folder just issued by them, illustrating the Welsbach-Kern radiators, These British-made fires, it is shown, can be had in a number of designs, and of different sizes, to suit various conditions.

A Cardiff domestic servant was found by her mistrees dead in bed with a strong smell of gas in the room. The gas-tap was half on, and it was said at the inquest to have been one that would turn very easily, Nothing was discovered to indicate that suicide was meditated, and the Jury found that death was accidental.

At the last meeting of the Warrington Town Council, Alderman Tinnion (the Chairman of the Gas Committee) referred to coke as a drug on the market. Mr. Osborne suggested that one way of disposing of the surplus coke would be to open depôts in different parts of the town where the public could buy it cheaply. To overcome the difficulty of distribution, they could use the tramlines during the night.

In a supplementary list of gas-compressors, Messrs. George Waller and Son, of Stroud, illustrate a number of machines that are used on gas-works. These are classified under the heads—high-speed fans for dealing with large volumes at light pressures, rotary compressors for dealing with pressures up to 5 to 6 lbs. per square inch, and single and double acting reciprocating compressors for working up to pressures of 50 lbs. per square inch.

## WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

**Appointments, &c, Vacant.**

ENGINEER AND MANAGER. Bath Gas Company. Applications by Nov. 10.
WORKING MANAGER. Knighton Gas Company.
WORKING MANAGER. No. 5951.
WORKING MANAGER. No. 5952.
WORKING MANAGER. No. 5947.
MAINTENANCE INSPECTOR. Blackpool Gas Department.
MAIN AND SERVICE LAYER AND GENERAL FITTER AND A STOKER. Whittington Gas Company.
STOKERS. No. 5949.

**Appointment Wanted**

SECRETARY AND ACCOUNTANT, &c. No. 5941.

**Gas-Works Wanted.**

Particulars to "PRINCIPAL," Scripps's Advertising Offices, 13, South Molton Street, W.

**Pupil Required.** No. 5948.

**Plant, &c. (Second-Hand), for Sale.**

COCKRAN BOILER. Morecambe Gas Department.

**Railway Tanks Wanted (on Hire).** No. 5950.

**Sales of Stocks and Shares.**

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY. London Mart. Nov. 17.
BOURNEMOUTH GAS AND WATER COMPANY. London Mart. Nov. 10.
GRAYS AND TILBURY GAS COMPANY. London Mart. Nov. 10.
UXBRIDGE GAS COMPANY. London Mart. Nov. 17.

**TENDERS FOR**

**Fire-Clay Goods.**

BRADFORD GAS DEPARTMENT. Tenders by Nov. 17.

## NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.*

**COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.**

**Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.**

**Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.**

**TERMS OF SUBSCRIPTION to the "JOURNAL."**

**United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.**
Payable in advance. If credit is taken, the charge is 25s. a year.

**Abroad (in the Postal Union): £1 7s. 6d., payable in advance.**

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

**Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.**


OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the *best*. Satisfaction Guaranteed.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, London, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones 815 Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

HUTCHINSON BROTHERS, Ltd.,
FALCON WORKS, BARNSLEY.

MANUFACTURERS OF
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS and SQUARE LANTERNS for Street Lighting,
INVERTED BURNERS and CONVERSION SETS for Street Lamps.

OXIDE OF IRON.
We are in a position to Supply Oxide of Iron promptly, and invite Enquiries.
SPENT OXIDE WANTED.
BALE & CHURCH, LTD.
5, CROOKED LANE, LONDON, E.C.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.
5, CROOKED LANE, LONDON, E.C.

"KLEENOFF," THE COOKER CLEANSER.
Tins for sale to Consumers.
In Bulk for Works Use.
BALE & CHURCH, LTD.
5, CROOKED LANE, LONDON, E.C.

**ROBERT DEMPSTER & SONS, Ltd.,** Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, Rose Mount Ironworks, Elland.

---

TUBULAR FABRICS FOR INCANDESCENT GAS MANTLES.

**BALM, HILL, & SONS, LTD.,**
NOTTINGHAM, ENGLAND.

Makers of all Sorts and Sizes.

---

WINKELMANN'S

**"VOLCANIC" FIRE CEMENT.**
Resists 4500° Fahr. Best for GAS-WORKS.
Andrew Stephenson, 171, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

---

**SULPHURIC ACID.**

**SPECIALLY prepared for Sulphate of** AMMONIA Makers by

**CHANCE AND HUNT, LIMITED.**

Works: Oldbury, Wednesbury, and Stafford.

Address Correspondence and Inquiries to Oldbury, Worcs.

Telegrams: "Chemicals, Oldbury."

---

**D. ANDERSON AND COMPANY,**
GAS LIGHTING ENGINEERS AND CONTRACTORS.
18 & 20, FARRINGDON ROAD, LONDON, E.C.

Telegrams: "Dacolight London." Telephone: 2886 Holborn.

---

TAR WANTED.

**JOSEPH A. HUTCHISON, LIMITED,**
Highbridge Wharf, SOMERSET.

---

**SULPHURIC ACID.**

**SPECIALLY prepared for the Manu-**facture of SULPHATE OF AMMONIA.

**SPENCER CHAPMAN & MESSEL, LTD.,**
with which is amalgamated Wm. Pearce & Sons, Ltd., 86, Mark Lane, London, E.C. Works: Silvertown.

Telegrams: "Hydrochloric, Fen. London."
Telephone: 1588 Avenue (3 lines).

---

ENQUIRIES SOLICITED.

**FOR Gas-Works Plant of Every De-**scription; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.

C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

---

**TAR WANTED.**

**THOMAS HORROCKS & SONS, LTD.,**
Albert Chemical Works,
Norton Street, Miles Platting, MANCHESTER.
Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Carbolic, Sulphate of Ammonia.

---

SPENCER'S PATENT HURDLE GRIDS.

**THE very best Patent Grids for Holding** Oxide Lightly.

See Illustrated Advertisement, Oct. 20, p. 158.

---

**SULPHATE OF AMMONIA** SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.

We Guarantee promptness with efficiency for Repairs.

Joseph Taylor and Co., Central Plumbing Works, Bolton.

Telegrams: "Saturators Bolton." Telephone 0848.

---

**J. E. C. LORD, Ship Canal Tar-Works,** Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

---

TAR WANTED.

**THE Burnden Tar Company (Bolton), Ld.**
Hulton Chemical Works, BOLTON.

---

**EDWARD COCKEY & SONS, LTD.,**
Supply
COMPLETE CARBONIZING PLANTS,
WASHER SCRUBBERS,
PURIFIERS,
SPIRAL OR STANDARD GUIDED GAS-HOLDERS.

Prices and Designs on Application to
THE IRONWORKS, FROME, or
London Office: 39, Victoria St., Westminster, S.W.

---

TO GAS AND WATER OFFICIALS.

**BEFORE Purchasing your 1914 Cycle,** kindly send post-card for our CATALOGUE, Cash or gradual Payments. Speciality, Slot-Meter Copper Collector. Melrose Cycle Co., Coventry.

---

**PATENTS AND TRADE MARKS**
PUBLICATIONS: "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 248 Holborn.

---

**JOHN RILEY & SONS, Limited, Chemi-**cal Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 years. References given to Gas Companies.

---

**SULPHURIC ACID — Specially pre-**pared for Sulphate of AMMONIA and BENZOL Recovery Plants. John Nicholson & Sons, Ltd., Hunslet Chemical Works, Leeds. Tele.: "Nicholson, Leeds." Telephone: (Two Lines) Nos. 2490 and 2491.

---

HYDRATED OXIDE OF IRON.

**PREPARED from Pure Iron.**
Twice as rich as Bog Ore.
Gives no back Pressure.
The Cheapest in the Market.
Read Holliday and Sons, Ltd., Huddersfield.

---

**GAS PLANT for Sale—We can always** offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
Firth Blakeley, Sons, and Company, Limited, Church Fenton, near Leeds.

---

**AMMONIACAL Liquor Wanted.**
Chance and Hunt, Ltd., Chemical Manufacturers, Oldbury, Worcs.
Telegrams: "Chemicals."

---

**"GAZINE" (Registered in England and** Abroad). A radical Solvent and Preventative of Naphthalene Deposits, and for the Automatic Cleaning of Mains and Services.
It is also used for the Enrichment of Gas.
Manufactured and Supplied by C. Bourne, West Moor Chemical Works, Killingworth, or through his Agents, F. J. Nicol & Co., Pilgrim House, Newcastle-on-Tyne.
Telegrams: "Doric," Newcastle-on-Tyne. National Telephone No. 2497.

---

CITY AND GUILDS GAS EXAMINATIONS.

**MR. CRANFIELD'S Correspondence** Classes are now Starting. Tuition is Thorough, Individual, and Private. Results Continue to be Strikingly Successful. Fifteen Years' Experience with Gas Classes.
Note Change of Address from Halifax to Manor Court Avenue, Nuneaton.

---

GENERAL CLERK—No. 5938.

**APPLICANTS for the Position of** GENERAL CLERK advertised under No. 5938 are THANKED and Informed that THIS HAS NOW BEEN FILLED.

---

**GAS Company Secretary and Account-**ant, Smart and Ambitious (age 33), with a thorough Practical Knowledge of the Routine of the Business; also a General Experience of the Management of the Works (takes Full Charge in absence of Manager), desires a Change to a Larger or Progressive Company in the same Capacity. Twelve Years with present undertaking in the Midlands making 25 Millions. First-class Credentials. Would take up Shares. Could be at liberty March 1, 1915.
Address, No. 5941, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

**WANTED—A Working Manager for** Gas-Works in Wales. Annual make, 2 Millions. Must be a Good Shovel Charger, used to Regenerative Settings, Knowledge of Gas-Fitting (Compo. and Iron). No House. None but thoroughly Practical and Energetic Men need Apply.
Apply, by letter, stating Age, Wages required, and sending Two recent Testimonials (*copies* only), to No. 5947, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

ENGINEER AND MANAGER.

**THE Bath Gas Light and Coke Com-**pany require the Services of a Fully-Qualified ENGINEER AND MANAGER, who has already had full Charge of a Gas-Works. Age, 30 to 40.
Applications, stating full Particulars of Qualifications, Experience, and Salary required, to be sent in, addressed to the undersigned, not later than Tuesday, Nov. 10, prox.

C. Stafford Ellery,
Engineer and Manager.

---

**WANTED—Working Manager for** Small Country Gas-Works making about Two Millions.
Apply, with full Particulars, stating Salary required, to No. 5952, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

**EXPERIENCED Working Manager** Wanted, Must be Practical, for Works of 6 Million Output. House Provided.
Apply, by letter, stating Qualifications, Wages required, &c., to No. 5951, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

**WANTED—A Working Manager for** a 6 Million Works. Wages, 34s. per Week, with House, Gas, and Coal. Must be a Competent Fitter and Main and Service Layer.
Applications, stating Age and Experience, with *copies* of Two Recent Testimonials, to the Secretary, Gas Company, Knighton, Radnorshire.

---

BLACKPOOL CORPORATION.
(Gas Department.)

**A MAINTENANCE Inspector required** to Attend to Consumers' Burners, Gas Fires, Cookers, and Fittings; also High-Pressure Lamps and Governors. Must be Experienced in all the above. Wages, 30s. per Week.
Apply, stating Age and Qualifications, to William Chew, Engineer and Manager, Gas Office, Princess Street, Blackpool.

---

**A GAS Engineer in the Midlands,** making 150 Millions per Annum, has a Vacancy for a Well-Educated Youth as PUPIL.
Address No. 5948, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

**WANTED, Leading and Second Stoker** for Gas-Works 20 miles from London.
Apply, by letter, to No. 5949, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

WHITTINGTON GAS COMPANY, LIMITED, near CHESTERFIELD.

**WANTED—A Good Main and Service** LAYER and GENERAL GAS-FITTER. Permanent Job to a Suitable Man willing to make himself useful.
Also a Good STOKER (Shovel Charger) required. Good Wages.
Apply to the Manager.

---

**ADVERTISER is prepared to Pay a** Commission to anyone Introducing a SMALL GAS-WORKS that can be PURCHASED for Cash, where there is Scope for Development.
Particulars in Confidence, or write for interview to "Principal," Scripps's Advertising Offices, 13, South Molton Street, W.

---

**WANTED for Hire at Once, Railway** TANK-WAGGONS suitable for carrying Benzols. Capacity 10-15 Tons.
Address No. 5950, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

---

MORECAMBE CORPORATION.
(Gas Department.)

**FOR SALE—A Cockran Boiler, in** Good Condition, 4 feet Diameter by 8 feet High. Guaranteed for a Working Pressure of 100 lbs. per square inch.
Offers to be addressed to the undersigned,

Harold Clapham,
Engineer and Manager.

---

**TANKS for Sale.—One Boiler Tank,** 6 ft. 6 in. diameter by 20 feet long. One ditto, 6 feet diameter by 16 feet long. STEEL TANK, 20 feet diameter by 12 feet deep. CAST-IRON TANK, 21 feet diameter by 10 feet deep. CAST-IRON TANK, 10 feet by 8 feet by 4 feet deep. Also other sizes. All Accessories for Gas-Works. Enquiries solicited.
Firth Blakeley, Sons, and Company, Limited, Church Fenton, Leeds.

---

CITY OF BRADFORD.

TO RETORT MANUFACTURERS.

**THE Bradford Corporation are pre-**pared to receive TENDERS for the Supply of GAS-RETORTS and of FIRE-BRICKS and FIRE-CLAY required in the Fixing of such Retorts, during the Year 1915.
Form of Tender may be obtained on Application to Mr. Chas. Wood, Gas Engineer, Town Hall, Bradford.
Tenders, endorsed "Tender for Retorts," to be sent to me so as to arrive not later than 9 a.m. on Tuesday, the 17th inst.
The Contract will be let subject to the Fair-Contracts Clauses of the Corporation.
The lowest or any Tender will not necessarily be accepted.

Frederick Stevens,
Town Clerk.

Town Hall, Bradford,
Nov. 2, 1914.